CSS Long Term Control Plan Update

Regulatory Requirements

City of Alexandria
Department of Transportation and Environmental Quality

FINAL – October 2014

GREELEY AND HANSEN

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Attachment A: City of Alexandria Combined Sewer System VPDES Permit
Attachment B: City of Alexandria Combined Sewer System VPDES Fact Sheet
Attachment C: Review Comments for the Draft Report: Bacteria TMDLs for the Hunting Creek, Cameron Run, and Holmes Run Watersheds dated July 19, 2010
Attachment D: Waste Load Allocation Tables from the Hunting Creek TMDL.

Section 1 Background

The City of Alexandria received its first Virginia Pollutant Discharge and Elimination System (VPDES) permit from the Virginia Department of Environmental Quality (VDEQ) in 1995 for its combined sewer system (CSS). In 1999, VDEQ approved the City's Long Term Control Plan (LTCP). The LTCP required the City to comply with the EPA's Nine Minimum Controls (NMCs) related to the operation and maintenance of the CSS. In 2010, the Virginia Department of Environmental Quality (VDEQ) issued the Hunting Creek TMDL. That TMDL called for an update to the City's LTCP (LTCPU). The latest permit issued to the City for the Combined Sewer System on August 23, 2013 incorporates the requirement to do the LTCPU in Section E.4. This technical memorandum describes the regulatory requirements and guidance associated with the LTCPU.

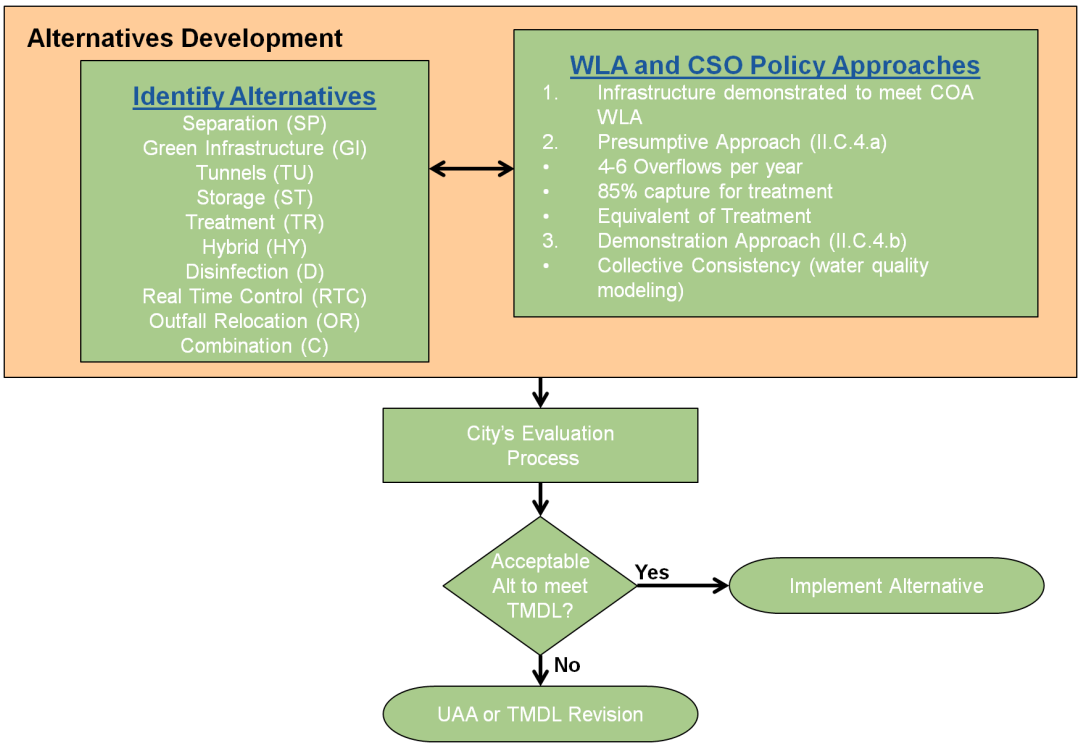
Section 2 Regulatory Requirements

2.1 General

Regulatory requirements as well as a desire to improve the environment of the City, drive the development of the Long Term Control Plan Update (LTCPU). A flow chart outlining the CSO control alternative development and evaluation options which the City will consider is included in Figure 2-1. This section discusses regulatory requirements and issues that will be, or potentially will be, addressed in the LTCPU. Regulatory issues include the following:

- The City's VPDES Permit for the CSS;
- The Hunting Creek Bacteria TMDL;
- The Federal Clean Water Act;
- Virginia Water Quality Standards;
- Use Attainability Analysis; and
- Other TMDLs pertinent to the CSS

Figure 2-1
LTCPU Flow Chart



2.2 VPDES Permit

The Virginia Department of Environmental Quality (VDEQ) issued VPDES permit No. VA0087068 (the Permit) for the Alexandria Combined Sewer System (CSS) on August 23, 2013. The Permit is attached as Attachment A. VDEQ also prepared a Fact Sheet that documents the basis for the requirements in the Permit. The Fact Sheet is attached as Attachment B.

The Permit requires an update to the City's approved CSS Long Term Control Plan to address the Hunting Creek TMDL. The permit recognizes that the City has a LTCP that was approved by VDEQ in February 1999. In the Fact Sheet, VDEQ evaluates the range of potential regulatory concerns from effluent monitoring including metals, toxics, and more. Continued monitoring and implementation of the City's LTCP address all but one of the constituents, E. coli bacteria. VDEQ concludes that based on the monitoring and the Hunting Creek TMDL that an update to the LTCP is needed specifically to address the E. coli bacteria Waste Load Allocation in the Hunting Creek TMDL:

- In accordance with the Hunting Creek Bacteria TMDL and the LTCPU shall comply with the bacteria wasteload allocations assigned at Outfalls 002/003/004. No reductions in CSO discharges are required at Outfall 001, since it does not discharge into Hunting Creek.
- The LTCPU shall also provide for combined sewer overflow controls…consistent with the Clean Water Act Section 402(q) and the State Water Control Law.

Accordingly, regulatory requirements for the LTCPU are based on the Hunting Creek TMDL and Clean Water Act Section 402(q).

2.2.1 TMDL Considerations for the LTCPU

The November 2010 Hunting Creek TMDL includes a number of provisions to guide the development of the LTCPU including:

- Waste Load Allocations (Table 2-1);
- TMDL LTCPU Guidance; and
- TMDL Assumptions.

2.2.1.1 Waste Load Allocations

On November 2, 2010, VDEQ issued Bacteria TMDLs for the Hunting Creek, Cameron Run, and Holmes Run Watersheds. These watersheds are shown on Figure 2-2. Figure 2-3 shows the percent reductions required under the TMDL. Actual Waste Load Allocations (WLA) for point sources in CFUs/year are included in Attachment D and specifically for the COA CSS on Table 2-1. The LTCPU will be developed to address the WLAs in Table 2-1.

Figure 2-2
Relevant Local Watersheds

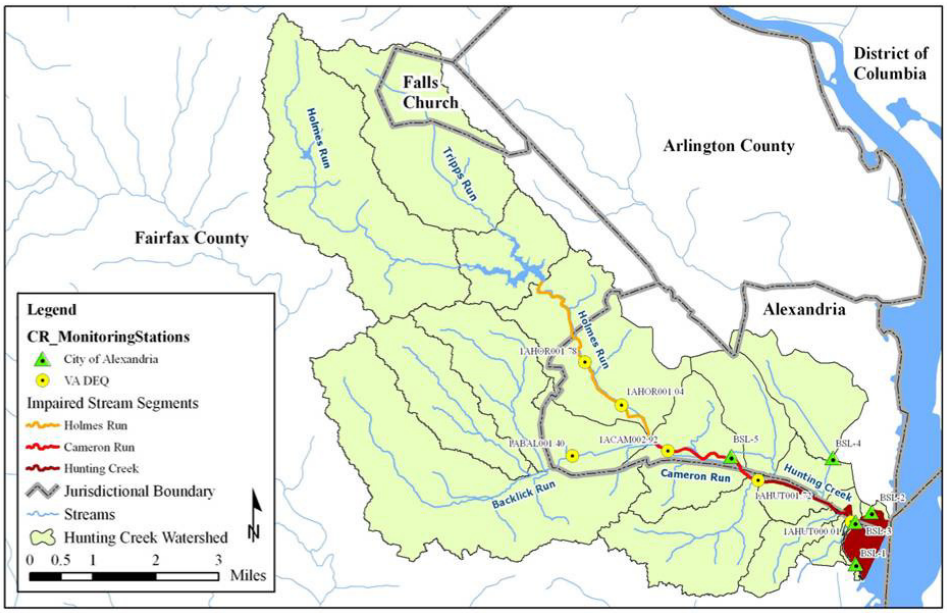


Figure 2-3
Required Reductions

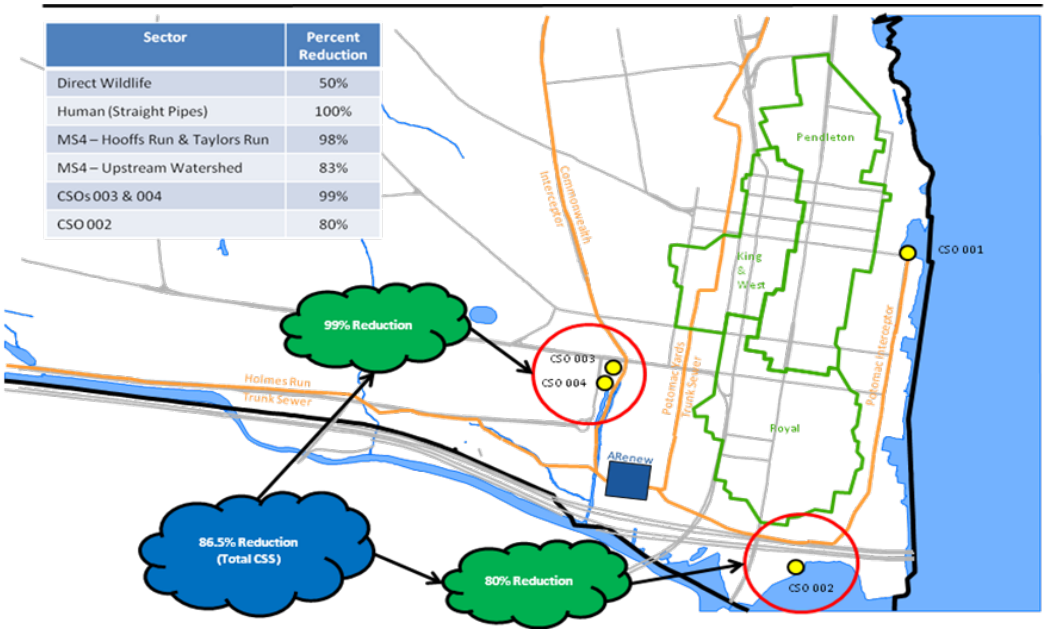


Table 2-1
Wasteload Allocation for COA Combined Sewer System

Permit Number	Outfall	Wasteload Allocation (cfu/year)	Permit Reduction (%)
VA0087068	002	6.26E+13	80%
	003	7.68E+11	99%
	004	8.52E+11	99%
	Total	6.42E+13	86%

2.2.1.2 TMDL LTCPU Guidance

The following TMDL statements are important to the development of the LTCPU and will be used in the development and evaluation of alternatives:

- *"…the Long Term CSO Control Plan (LTCP) is the mechanism for developing and implementing plans that will achieve compliance with Water Quality Standards (WQS). The current, approved LTCP of the City will need to be updated to address the TMDL."* (Section 6.3.4)
- *"The WLA associated with the combined sewer system will be addressed through the performance standards for the facilities in a revised approved Long Term Control Plan (LTCP)."* (Table 5-5)
- *"Percent reduction (as shown in Table 2-1) is based on average annual WLA, and is computed as a reduction from baseline loadings."* (Table 5-5)
- *"…average daily values are not intended to represent maximum allowable daily loads. Rather, they represent the average daily loadings that may be expected to occur over the long term."* (Section 5.2.4)

The TMDL indicates the LTCPU may have a number of outcomes consistent with the flexibility of the CSO Control Policy including the following:

- WQS adapted to reflect site-specific conditions;
- TMDL Update;
- Use Attainability Analysis "*If water quality standards are not being met, a use attainability analysis (UAA) may be initiated to reflect the presence of naturally high bacteria levels due to uncontrollable sources." (Section 6.4.2).* We note that other factors also may support a UAA per 40 CFR Part 131.10(g).

2.2.1.3 TMDL Assumptions

The Hunting Creek TMDL includes multiple assumptions to develop the WLA assigned to the City's CSO discharges. The City commented on the assumptions used in the water quality modeling that established the WLAs (Attachment C). Some of these are listed as follows:

WWTP Load
"In tidal Hunting Creek, two additional conservative assumptions were made. First, the concentration of the source responsible for the largest volume of water entering tidal Hunting Creek, [AlexRenew's] WWTP, was set at the fecal coliform equivalent of its monthly E. coli permit limit, 126 cfu/100 ml, which is also the geometric mean water quality criterion."

Potomac Boundary
"Second… TMDL scenarios for tidal Hunting Creek were developed based on the principle that the tidal drainage to Hunting Creek had to meet water quality standards without significant dilution from the Potomac River." (Section 5.1)…. "The concentrations at the boundaries of the model domain in the Potomac River were held at the fecal coliform equivalent of the E. coli geometric mean standard of 126 cfu/100 ml" (Section 5.1)

Proportional v. Discrete controls
"Reductions in CSO bacteria loads were simulated by keeping the simulated bacteria concentration at the outfall's baseline level, but proportionately reducing flows on each day an overflow occurs. In other words, a 50% reduction in CSO loads was implemented by reducing flows by 50% for each overflow event." (Section 5.2.2)

Decay Rates
"As can be seen in the following figures, the simulation which uses a decay rate of 0.1/day best matches the distribution of the observed data at each monitoring station." (Section 4.3.6)

2004-2005 Climate Period
"Potential TMDL scenarios were run for the two-year simulation period of 2004-2005. This period includes representative low and high flow conditions but excludes the record low flow (2002) and high flow (2003) years of the calibration."

These assumptions do not necessarily represent the actual nature of CSO impacts. While it may be possible to address the TMDL as required without rectifying all these assumptions, each will be documented and discussed in the LTCPU.

2.2.1.3.1 WWTP Load

The Hunting Creek TMDL is based on the AlexRenew WWTP discharging at its fully permitted bacterial load. The WWTP typically operates well below this level. As described in Figure 2-1 above, an alternative with infrastructure to meet the TMDL with the WWTP at its permitted load will be developed. In addition, alternatives that utilize collective consistency as described below will be developed and evaluated.

2.2.1.3.2 Potomac Boundary

Setting the boundary of the TMDL at the Water Quality Standard is a practice used by VDEQ in developing TMDLs. It is not required by law or regulation. Under the demonstration approach of USEPA CSO Policy the demonstration approach (Section II.C 4.b of CWA 402(q) described below) the LTCPU is required to show that after controls are implemented the CSOs will not preclude the attainment of WQS or the receiving waters' designated uses or contribute to their impairment. Typical demonstration approach WQS evaluation would include assessment of actual expected WQ after TMDL implementation and not assume the upstream load was at the WQS. It may be possible to demonstrate compliance with WQS using the boundary assumptions made by VDEQ. However, if these assumptions prove to be an impediment to showing the City meets the demonstration approach, it will be re-evaluated in the LTCPU.

Note that the non-Potomac upstream flows from Cameron Run and Hoofs Run will be evaluated at the time variable levels expected from the TMDL controls.

2.2.1.3.3 Proportional v. Discrete controls

The TMDL modeled all TMDL controls proportionally. If the WLA for stormwater calls for a 90% reduction, each storm event is reduced by 90%. CSO loads are modeled the same way. While most stormwater and other controls may be well represented by this proportional approach, most CSO controls are not proportional to each storm event. CSO controls using conveyance, treatment, or storage typically eliminate all loads from small storms and allow a limited number of large storms to continue with some varied control depending on the storm size. However, to be consistent with the TMDL assumptions for the “infrastructure to meet the COA WLA” alternative indicated in the Figure 2-1, a tunnel or other infrastructure will be sized to capture the percent capture called for in the TMDL (99% for CSOs 3 and 4 and 80% for CSO 002) on a daily basis.

All other alternatives will use the actual level of control resulting from the control technology. For example, for a tunnel sized for 4 overflows per year the LTCPU will evaluate 100% control for the captured overflow for all storms fully captured by the tunnel. For storms causing overflows, the estimated overflow load will be used. Proportional controls will be used where appropriate (such as for stormwater) and discrete controls will be used for storage and conveyance options for CSOs.

2.2.1.3.4 Decay Rates

Decay rates are used to estimate the in stream die off of bacteria. The decay rates used in the VDEQ TMDL development are 0.1/day as stated on page 4-62 of the *Hunting Creek TMDL*. These very low decay rates have been shown by the City to be inconsistent with locally established decay rates of 1.0/day as established in the *Potomac River Dynamic Estuary Model* (DEM). The DEM has been the principal model for evaluating the Potomac River for more than 30 years. It was originally developed as a Metropolitan Washington Council of Governments (MWCOG) collaborative effort and has been used to evaluate TMDL's and CSO's along the Potomac River. The DEM was updated and recalibrated for the DC Water LTCP. The final calibrated model used a decay rate of 1.5 per day and a temperature correction factor of 1.0 for both fecal coliform and E. coli. As with the Potomac Boundary conditions, it may be possible to demonstrate compliance with WQS using the low decay assumptions made by VDEQ. However, if these assumptions prove to be an impediment to showing the City meets the 402(q) approach, it will be re-evaluated in the LTCPU.

2.2.1.3.5 Climate Period

The TMDL climate period is stated as excluding the record high and low flow years. However, CSO controls are driven principally by peak storm events. Based on work done as part of the City's ongoing City-wide modeling effort with AlexRenew and Fairfax County, the 2004-2005 TMDL period includes the second largest storm event in 40 years. A review of the 40 year record indicates this storm may exceed a 25-year recurrence interval. While a critical period is called for in TMDL assessment, the inclusion of a 25-year storm for CSO assessment is extraordinary. Recreational uses do not exist during the 25-year storm. Nevertheless, the "infrastructure to meet the COA WLA" alternative indicated in the Figure 2-1 will use this 2004-2005 climate period. In addition, as indicated below, the typical year will also be used to examine meeting CWA requirements under 402(q).

2.3 Federal Clean Water Act Section 402(q)

USEPA issued its CSO Policy in 1994. The Policy was later adopted into the Federal Clean Water Act. The City of Alexandria obtained approval for its LTCP in 1999. As discussed in the current Permit, the LTCPU is needed to address water quality E. coli issues identified in the Hunting Creek TMDL. The USEPA Policy and Guidance indicate the following with respect to LTCP updates addressing conditions where water quality standards (WQS) are not being met after implementation of an approved LTCP:

> *"…if adequately supported with data and analysis, Agency regulation and guidance provide states with the flexibility to adopt their WQS, and implementation procedures to reflect site-specific conditions including those related to CSOs."*

The USEPA Policy and Guidance are reflected in the Hunting Creek TMDL with the discussion of regulatory alternatives repeated here from above:

- WQS adapted to reflect site-specific conditions;
- TMDL Update; and
- Use Attainability Analysis.

Prior to investigating any of these regulatory alternatives, an alternative that meets the City's WLA in Table 2-1 will be developed and evaluated with infrastructure to meet the Table 2-1 City of Alexandria WLA. This alternative will include the TMDL WLA that calls for each storm for CSOs 003 and 004 to be controlled to 99% and each storm for CSO 002 must be controlled to 80%.

EPA's CSO policy provides four performance standards under two approaches for the development of alternatives as follows:

2.3.1 Presumption Approach

The Presumption approach provides three paths to an acceptable CSO plan:

- Presumption Option i – Up to 6 overflows in a typical year*;
- Presumption Option ii – Capture for treatment of 85% of the CSS flow in a typical year. A minimum of primary treatment is required with disinfection where required; and
- Presumption Option iii – The removal of a load equivalent to what would be removed under Option ii.

  *A separate technical memorandum will be developed and submitted to establish average design conditions based on the typical year.

2.3.2 Demonstration Approach

Under the EPA CSO policy, a control level less than called for by the presumption approach (described above) can be selected if it can be demonstrated that "*the CSO discharges remaining after implementation of the planned control program will not preclude the attainment of WQS or the receiving waters' designated uses or contribute to their impairment.*" The demonstration approach alternative will evaluate the following potential approaches:

- Collective Consistency for all WLAs in Table 2-1 and Appendix D Table 5-4, including conservatively accounting for unused load from other contributing sources based on historic performance. One area shown in the Appendix D Table 5-4 and to be addressed is the future growth for point sources and the best use of the long term need for the growth allocation.; and
- If necessary, a demonstration that the CSO loads do not cause or interfere with designated use using the WLA shown in Figure 2-3 and the VDEQ WQS for bacteria. If possible, this demonstration will be done with the water quality models utilized in the development of the Hunting Creek TMDL. Water quality models may be updated based on new information, or changes in conditions.

2.4 Virginia Water Quality Standards

This LTCPU is being conducted to address the E.coli WQS issue identified in the Hunting Creek TMDL. The WLAs for the City of Alexandria shown in Table 2-1 indicate the load that if attained, will address the City's obligation to meet WQS. The total WLA is intended to attain the VDEQ WQSs. At the time of the initial listing of Hunting Creek (VAN-A13E-02), the Virginia bacteria water quality criteria was

expressed in fecal coliform bacteria; however, the bacteria water quality criteria was changed and is now expressed in E. coli. The regulation applicable to Hunting Creek is now stated as follows:

> *9VAC25-260-170. Bacteria; other recreational waters.*
> *A. The following bacteria criteria (colony forming units (CFU/100 ml)) shall apply to protect primary contact recreational uses in surface waters, except waters identified in subsection B of this section:*
>
> *E. coli bacteria shall not exceed a monthly geometric mean of 126 CFU/100 ml in freshwater. Enterococci bacteria shall not exceed a monthly geometric mean of 35 CFU/100 ml in transition and saltwater.*
> *1. See 9VAC25-260-140 C for boundary delineations for freshwater, transition and saltwater.*
> *2. Geometric means shall be calculated using all data collected during any calendar month with a minimum of four weekly samples.*
> *3. If there are insufficient data to calculate monthly geometric means in freshwater, no more than 10% of the total samples in the assessment period shall exceed 235 E.coli CFU/100 ml.*

2.5 Use Attainability Analysis

As indicated in the USEPA CSO Policy and Guidance, a use attainability analysis (UAA) may be considered in a LTCPU. There are six criteria under which the Virginia State Water Control Board may modify the use and standard (*9VAC25-260-170).* Of the six, the following are applicable to the LTCPU if an acceptable alternative for meeting the TMDL cannot be approved by VDEQ:

- Natural occurring pollutants prevent the use – this may include wildlife;
- Natural water levels prevent the use – this may include unsafe conditions in-stream for recreation during high flow conditions;
- Human caused conditions where remedies would cause more environmental damage to correct than to leave in place – this could apply to storm water controls and CSO controls; and/or
- Widespread socio-economic impacts.

2.6 Other TMDLs Pertinent to the CSS

A PCB TMDL for the tidal Potomac River watershed has been completed and was approved by EPA on 31 October 2007. The City of Alexandria CSS was identified as a source of PCBs in the TMDL but no reductions in loadings are required. There is also a TMDL for the Chesapeake Bay (Bay TMDL) finalized on 29 December 2010 for nitrogen, phosphorous, and sediment. The CSS was included in the watershed implementation plan (WIP) submitted to EPA for the Bay TMDL on 29 November 2011. Essentially, wasteload allocations assigned to this CSS equates to the current Long Term Control Plan consisting of the Nine Minimum Controls. The Chesapeake Bay CSS wasteload allocation at the edge of stream (EOS in the table) is provided in Table 2-2 below. As part of the LTCP update, the City may evaluate potential credits for nutrients and sediments to be applied towards the City's municipal separate storm sewer system (MS4) requirements.

Table 2-2
Bay TMDL CoA Allocations

Permit Name	NPDES ID	Jurisdiction	Segment ID	TN EOS WLA (lbs/yr)	TP EOS WLA (lbs/yr)	TSS EOS WLA (lbs/yr)
ALEXANDRIA CSO	VA0087068	VA	POTTF_VA	5,201	690	62,355

TN EOS – Total Nitrogen Edge of Stream
TP EOS – Total Phosphorous Edge of Stream
TSS EOS – Total Suspended Solids Edge of Stream

Section 3 Regulatory Aspects of Alternative Development and Evaluation

An alternative development and evaluation flow chart is shown on Figure 2-1. The selection process is anticipated to include the following steps:

- A series of alternatives will be developed with multiple levels of control.
  - It is expected that one series of alternatives will include tunnels/storage.
  - A range of tunnel/storage alternatives will be developed that includes meeting the WLA during the TMDL Climate period (2004-2005). In addition a range of alternatives will be developed meeting the presumptive approach and potentially a demonstration approach using the typical year (1984) as the assessment period. These additional alternatives will be evaluated to determine if the WLAs are met in the TMDL Climate period (2004-2005).
  - Each alternative may be augmented with green technology, separation and other controls.
- The City will use its evaluation criteria to determine if an alternative is acceptable.
  - If an acceptable alternative will meet the TMDL WLA then the City will select and implement it.
  - If no acceptable alternative will meet the TMDL WLA then the City will propose:
    - A presumptive level of control; OR
    - A demonstration level of control using collective consistency.
- If the level of control is approved by DEQ, the City will implement.
- If not approved, the City will pursue a UAA and/or TMDL revision.

Attachment A

City of Alexandria Combined Sewer System VPDES Permit

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY
NORTHERN REGIONAL OFFICE
13901 Crown Court, Woodbridge, Virginia 22193
(703) 583-3800 Fax (703) 583-3821
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Douglas W. Domenech
Secretary of Natural Resources

David K. Paylor
Director

Thomas A. Faha
Regional Director

22 August 2013

Mr. Richard J. Baier, P.E.
Director of Transportation and Environmental Services
City of Alexandria
301 King Street, Room 4100
Alexandria, VA 22314

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Re: Reissuance of VPDES Permit No. VA0087068
Alexandria Combined Sewer System, City of Alexandria

Dear Mr. Baier:

The Department of Environmental Quality (DEQ) has approved the enclosed effluent limitations and monitoring requirements for the aforementioned permit. Copies of your permit and fact sheet are enclosed.

As provided by Rule 2A:2 of the Supreme Court of Virginia, you have thirty days from the date of service (the date you actually received this decision or the date it was mailed to you, whichever occurred first) within which to appeal this decision by filing a notice of appeal in accordance with the Rules of the Supreme Court of Virginia with the Director, Department of Environmental Quality. In the event that this decision is served on you by mail, three days are added to that period.

Alternately, any owner under §§ 62.1-44.16, 62.1-44.17, and 62.1-44.19 of the State Water Control Law aggrieved by any action of the State Water Control Board taken without a formal hearing, or by inaction of the Board, may demand in writing a formal hearing of such owner's grievance, provided a petition requesting such hearing is filed with the Board. Said petition must meet the requirements set forth in §1.23(b) of the Board's Procedural Rule No. 1. In cases involving actions of the Board, such petition must be filed within thirty days after notice of such action is mailed to such owner by certified mail.

Please contact Douglas Frasier at 703-583-3873 or via email at Douglas.Frasier@deq.virginia.gov if you have any questions pertaining to the permit.

Respectfully,

Bryant Thomas
Regional Water Permit & Planning Manager

Enc.: Permit for VA0087068
Fact Sheet for VA0087068

cc: DEQ-Water, OWPP
EPA-Region III, 3WP12
Department of Health, Culpeper
Water Compliance, NRO
Lalit Sharma, City of Alexandria via Lalit.Sharma@alexandria.gov

Event	Date	Initials
Code:		
Scanned	8/26/13	CN

COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

Permit No. **VA0087068**
Effective Date: **August 23, 2013**
Expiration Date: **August 22, 2018**

AUTHORIZATION TO DISCHARGE UNDER THE
VIRGINIA POLLUTANT DISCHARGE ELIMINATION SYSTEM
AND THE VIRGINIA STATE WATER CONTROL LAW

In compliance with the provisions of the Clean Water Act as amended and pursuant to the State Water Control Law and regulations adopted pursuant thereto, the following owner is authorized to discharge in accordance with the information submitted with the permit application, and with this permit cover page, Part I – Effluent Limitations and Monitoring Requirements, and Part II – Conditions Applicable To All VPDES Permits, as set forth herein.

Owner Name:	City of Alexandria
Facility Name:	Alexandria Combined Sewer System
City:	Alexandria
Facility Location:	City of Alexandria, VA

The owner is authorized to discharge to the following receiving streams:

Stream Names:	Hooffs Run, Hunting Creek and Oronoco Bay
River Basin:	Potomac River
River Subbasin:	Potomac River
Section:	07, 06, 06 (respectively)
Class:	III, II, II (respectively)
Special Standards:	b; b,y; b,y (respectively)

for
Thomas A. Faha
Director, Northern Regional Office
Department of Environmental Quality

August 22, 2013
Date

A. Effluent Monitoring Requirements

Outfalls 001/002/003/004 – Combined Sewer Overflows (CSOs)

a. There shall be no discharge of floating solids or visible foam in other than trace amounts.

b. There shall be no dry weather discharges.

c. During the period beginning with the permit's effective date and lasting until the expiration date, the permittee is authorized to discharge from the Combined Sewer System (CSS) at Outfall Number 001, Outfall Number 002, Outfall Number 003 and Outfall Number 004 during wet weather events. Such discharges shall be monitored by the permittee as specified below.

Parameter	Discharge Limitations				Monitoring Requirements	
	Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NA	NA	NL	1/Q	Estimate
pH	NA	NA	NL S.U.	NL S.U.	1/Q	Grab
$cBOD_5$	NA	NA	NA	NL mg/L	1/Q	Grab
Total Suspended Solids (TSS)	NA	NA	NA	NL mg/L	1/Q	Grab
Dissolved Oxygen (DO)	NA	NA	NL mg/L	NA	1/Q	Grab
Total Kjeldahl Nitrogen (TKN)	NA	NA	NA	NL mg/L	1/Q	Grab
Ammonia, as N	NA	NA	NA	NL mg/L	1/Q	Grab
E. coli [1] [2]	NA	NA	NA	NL n/100 mL	1/Q	Grab
Oil & Grease	NA	NA	NA	NL mg/L	1/Q	Grab
Nitrate+Nitrite, as N	NA	NA	NA	NL mg/L	1/Q	Grab
Total Nitrogen [3]	NA	NA	NA	NL mg/L	1/Q	Calculated
Total Phosphorus	NA	NA	NA	NL mg/L	1/Q	Grab
Chlorides	NA	NA	NA	NL mg/L	1/Q	Grab
Zinc, Total Recoverable	NA	NA	NA	NL µg/L	1/Q	Grab
Copper, Total Recoverable	NA	NA	NA	NL µg/L	1/Q	Grab
Rainfall	NA	NL inches	NA	NA	1/Q	Measured
Rainfall Duration	NA	NL hours	NA	NA	1/Q	Recorded
Duration of Discharge	NA	NL hours	NA	NA	1/Q	Estimate

[1] Reported as concentration per monitored discharge event.

[2] In accordance with the Hunting Creek Bacteria TMDL and the Long Term Control Plan Update (Part I.E.4.), the CSS shall comply with the bacteria wasteload allocations assigned at Outfalls 002/003/004.

[3] Total Nitrogen = Sum of TKN plus Nitrate+Nitrite.

MGD = Million gallons per day.
NA = Not applicable.
NL = No limit; monitor and report.
S.U. = Standard units.
1/Q = Once every calendar quarter.

Estimate = Reported flow and duration is to be based on the technical evaluation of the sources contributing to the discharge.
Grab = An individual sample collected over a period of time not to exceed 15-minutes.

Each outfall shall be monitored during the following calendar year:
Year 2014 – Outfall 001; Year 2015 – Outfall 002; Year 2016 – Outfall 003; and Year 2017 – Outfall 004

Beginning in Year 2018, the permittee shall repeat the aforementioned monitoring schedule, or an alternate monitoring plan approved by DEQ, until such time a new permit is reissued.

The quarterly monitoring periods shall be January through March, April through June, July through September, and October through December.

B. Quantification Levels and Compliance Reporting

1. Quantification Levels

   a. The quantification levels (QL) shall be less than or equal to the following concentrations:

Characteristic	Quantification Level
TSS	1.0 mg/L
$cBOD_5$	2 mg/L
Ammonia	0.20 mg/L
Copper	8.0 µg/L
Zinc	72 µg/L

   b. The QL is defined as the lowest concentration used to calibrate a measurement system in accordance with the procedures published for the method. The permittee shall use any method in accordance with Part II.A. of this permit.

   c. It is the responsibility of the permittee to ensure that proper quality assurance/quality control (QA/QC) protocols are followed during the sampling and analytical procedures. QA/QC information shall be documented to confirm that appropriate analytical procedures have been used and the required QLs have been attained.

2. Compliance Reporting for parameters in Part I.A.

   a. Single Datum – Any single datum required shall be reported as "< QL" if it is less than the QL used in the analysis (QL must be less than or equal to the QL listed in Part I.B.1.a above). Otherwise the numerical value shall be reported.

   b. Significant Digits – The permittee shall report at least the same number of significant digits as the permit limit for a given parameter. Regardless of the rounding convention used (i.e., 5 always rounding up or to the nearest even number) by the permittee, the permittee shall use the convention consistently and shall ensure that consulting laboratories employed by the permittee use the same convention.

C. Verification of Predicted Events

The permittee shall continue to monitor for pollutants of concern at all CSS Outfalls and additionally, the response of the CSS system to various wet weather events. The monitoring frequencies and requirements are specified in Part I.A.

The permittee shall continue to utilize modeling to predict the occurrence, duration and volume of each Combined Sewer Overflow (CSO) event for each outfall. Furthermore, outfall monitoring data shall be used to validate and calibrate the model as necessary. The permittee shall summarize the findings with the Annual Report required by Part I.E.12.

D. Long Term Control Plan

The permittee's Long Term Control Plan (LTCP) was approved by DEQ in February 1999. The developed LTCP consists of the nine minimum technology-based requirements of the CSO Control Policy. This permit requires continued implementation of the LTCP.

1. Conduct Proper Operations and Regular Maintenance Programs

   The permittee shall continue to implement the operation and maintenance plan for the Combined Sewer System (CSS) that includes the elements listed below. The permittee shall update the plan to incorporate any changes to the system and shall operate and maintain the system accordingly. The permittee shall maintain records documenting implementation of the plan.

a. Designation of a Manager for the CSS.

The permittee shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding the CSS.

b. Inspection and Maintenance of CSS.

The permittee shall inspect and maintain all CSS structures, regulators and tide gates to ensure proper working condition, adjusted to minimize CSOs and tidal inflow. The permittee shall inspect each CSS outfall at an appropriate frequency to ensure no dry weather overflows are occurring. The inspection may include, but is not limited to, entering the regulator structure if accessible, determining the extent of debris and grit buildup and removing any debris that may constrict flow, cause blockage or result in a dry weather overflow. For CSS outfalls that are inaccessible, the permittee may perform a visual check of the overflow pipe to determine whether or not the CSO is occurring during dry weather flow conditions.

The permittee shall record in a maintenance log book the results of any and all inspections conducted.

c. Provision for Trained Staff.

The permittee shall continue to ensure the availability of trained staff to complete the operation, maintenance, repair and testing functions required to comply with the terms and conditions of this permit. Each staff member shall receive appropriate training and all training shall be documented and updated annually.

d. Allocation of funds for O&M.

The permittee shall allocate adequate funds specifically for CSS operation and maintenance activities.

2. Maximize Use of the Collection System for Storage

The permittee shall maximize the in-line storage capacity of the CSS. The permittee shall maintain records to document implementation.

a. Maintain all dams or diversion structures at their current heights, as of the effective date of this permit, or greater.

b. Minimize discharges from the CSS outfalls by maximizing the storage capacity provided by the dams and diversion structures; allowing for later treatment at the Publicly Owned Treatment Works (POTW).

c. Maintain maintenance records for the dams or diversion structures and activities dealing with sewer blockages.

3. Control of Non-domestic Discharges

The permittee shall continue to implement selected CSO controls to minimize the impact of non-domestic discharges. Control of non-domestic users shall, at minimum, include the following:

a. Maintain records documenting this evaluation and implementation of the selected CSO controls to minimize CSO impacts resulting from non-domestic discharges;

b. Educating Significant Industrial Users (SIUs) discharging to the CSS to minimize, to the extent practicable, batch discharges during wet weather conditions; and

c. Continued control of illicit dischargers and/or improper disposal to the CSS via detection and elimination.

4. Maximize Flow to POTW

The permittee shall convey, to the greatest extent practicable, all wet weather flows to the POTW within the constraints of the CSS and the capacity of the POTW. The POTW is owned, operated and maintained by Alexandria Renew Enterprises and is regulated under a separate VPDES permit (VA0025160). The permittee shall maintain records to document these actions.

5. Prohibit Combined Sewer Overflows during Dry Weather

Dry weather overflows from CSS outfalls are prohibited. Dry weather flow conditions shall mean the flow in a combined sewer that results from sanitary sewage, industrial wastewater and infiltration/inflow; with no contribution from stormwater runoff or stormwater induced infiltration. Wet weather flow condition shall mean the flow in a combined sewer including stormwater runoff and/or stormwater induced infiltration.

Documentation required during dry weather CSO events are as follows:

a. All dry weather overflows must be reported to DEQ and the local health department within 24 hours of when the permittee becomes aware of any dry weather overflows (Part II.G.);

b. Upon becoming aware of an overflow, the permittee shall begin corrective action immediately. The permittee shall monitor the dry weather overflow until the overflow has been eliminated; and

c. The permittee shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, discharge volume and corrective measures taken.

6. Control Solid and Floatable Materials

The permittee shall continue to implement measures to control solid and floatable materials in the CSS. Such measures shall include, but not limited to:

a. Regular catch basin and street cleaning within the CSS sewershed;

b. Cleaning of the trunk lines and structures to prevent accumulation of solids; and

c. Consideration of entrapment and baffling devices to reduce discharges of solids and floatable materials.

7. Develop and Implement Pollution Prevention Program

The permittee shall continue to implement the pollution prevention (P2) program to reduce the impact of CSOs on receiving waters. The permittee shall maintain records to document the pollution prevention implementation activities. Specific P2 measures include, but not limited to:

a. Street sweeping and catch basin cleaning at an appropriate frequency to prevent large accumulations of pollutants and debris;

b. A public education program that informs the public of the City's household hazard waste recycling program; and

c. A waste oil and antifreeze recycling/referral service program.

8. Public Notification

The permittee shall continue to implement a public notification plan to inform citizens of when and where CSOs occur. The process shall include, but not limited to:

a. A notice to alert persons using all affected receiving water bodies. The permittee shall ensure that identification signs at all CSS outfalls are maintained and easily readable by the public.

b. The permittee shall maintain records documenting public notification.

9. CSO Monitoring

The permittee shall monitor pollutants of concern at each CSS outfall pursuant to Part I.A. to continue characterizing CSO impacts and the efficacy of CSO controls.

E. Other Requirements and Special Conditions

1. Water Quality Criteria Reopener

Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

2. No New Combined Sewers Requirement

No new combined sewers shall be built outside the existing combined sewer system service areas of the City. This requirement shall not be construed to prevent the connection of new sanitary sewers to combined sewers within the existing combined sewer service area for the purpose of conveying sewage to the POTW. No new connections shall be made to the combined sewers where those connections would cause overflows during dry-weather flow conditions or exacerbate CSO events.

3. Reopener Clause

This permit may be modified or revoked and reissued, as provided pursuant to 40 CFR 122.62 and 124.5, for the following reasons:

a. To include new or revised conditions developed to comply with any State or Federal law or regulation that addresses CSOs that is adopted or promulgated subsequent to the effective date of this permit;

b. To include new or revised conditions if new information, not available at the time of permit reissuance, becomes available that would lead to the attainment of Virginia Water Quality Standards; and

c. To include new or revised conditions based on new information resulting from implementation of the long-term control plan.

4. Long Term Control Plan Update (LTCPU)

The permittee shall develop a Long Term Control Plan Update (LTCPU), consistent with the September 1995 EPA Guidance for LTCP, setting forth an implementation plan by which the permittee will achieve compliance with the approved Hunting Creek Bacteria Total Maximum Daily Load (TMDL). The LTCPU shall also provide for combined sewer overflow controls to comply with all applicable water quality standards for the receiving waters consistent with the Clean Water Act Section 402(q) and the State Water Control Law.

A draft work plan detailing the process and schedule for how the permittee will prepare the LTCPU, including public participation, shall be submitted to DEQ on or before 23 May 2014 for review and comment. The final LTCPU shall be submitted on or before 23 August 2016 for DEQ review and approval. The LTCPU shall contain clearly defined, measureable milestones that will demonstrate compliance with the aforementioned TMDL and applicable water quality standards as soon as practicable; however, no later than 31 December 2035. Upon DEQ approval, the LTCPU shall be incorporated by reference and becomes enforceable under this permit.

The permittee shall publish the plan on the City's combined sewer system web page for public access no later than fifteen (15) days following DEQ approval. This document shall remain on the City's website for the duration of the LTCPU implementation period. The permittee may modify the LTCPU as warranted and shall submit any modifications to DEQ for review and approval prior to implementation of any changes.

The permittee shall provide progress summaries in the annual reports.

5. Additional Public Notification Requirements

In addition to the public notification requirements stated in Part I.D.8 of this permit, the permittee shall:

a. Publish all annual reports required by this permit on the City's combined sewer system web page upon DEQ review and comment. Each report shall be retained on the website for a period of no less than two (2) years;

b. Provide semiannual notifications regarding CSO conditions to interested citizens. This shall commence on or before 31 December 2013; and

c. In addition to the current signage, install universal pictograms at each outfall location on or before 31 December 2013.

A sample of the proposed pictogram shall be submitted to DEQ for review and approval 90 days prior to procurement and installation.

6. Public Information Meeting

The permittee shall conduct public informational meetings during the development of the LTCPU and prior to submitting the final update for DEQ approval. These meetings shall be conducted on or before 23 February 2015 and 23 August 2016, respectively. These meetings shall, at a minimum, explain combined sewer systems, the impacts on surface waters, progress to date on minimizing the impacts, the proposed LTCPU milestones/schedule to comply with the Hunting Creek TMDL and shall allow for public comments and inquiries.

The permittee shall conduct the meetings at such times as to maximize attendance and shall utilize at least three (3) forms of media to inform the public concerning the place, time and purpose for the these meetings.

7. Funding

The permittee shall outlay a minimum of $2,500,000 during this permit term for CSO abatement projects. The permittee shall submit annual reports detailing fund expenditures to date and future/proposed expenditures.

8. Stormwater and *E. coli* Loading Management

The permittee shall, at a minimum, implement the five programs below to achieve a reduction of at least 5 million gallons of stormwater entering the CSS, or the *E. coli* loading CSO discharge reduction equivalent, annually by the end of this permit term. The permittee shall estimate and report annually the amount of stormwater not entering the CSS and/or *E. coli* loading reductions during overflow events due to separation, stormwater detention/retention, outfall improvements and green infrastructure projects. The permittee shall, at a minimum, achieve reductions via the following five programs:

a. Combined Sewer Service Area Reduction Plan (ARP)

The ARP, dated December 2005 (updated May 2013), requires the separation of storm and sanitary sewers associated with most development projects within the CSS sewershed. The permittee shall submit reports annually detailing ongoing and proposed projects. If a project did not include separation, the permittee shall submit a thorough explanation within the report.

The ARP and any future amendments are incorporated by reference and become enforceable under this permit.

b. Green Initiative

The permittee shall study, implement and promote green infrastructure projects within the CSS sewershed during this permit term. Projects evaluated shall include, but are not limited to: rainfall harvesting, permeable pavements, rain gardens, green roof installation, bioretention cells, urban forestation/reforestation and public education.

c. Green Public Facilities

The permittee shall evaluate the practicality of incorporating green infrastructure during major maintenance/enhancement projects at all city facilities (offices, schools, libraries etc) located within the CSS sewershed. The permittee shall include with the annual reports, commencing with the report for 2014: (1) a schedule of maintenance/enhancement projects at city facilities within the CSS sewershed for the forthcoming fiscal year; (2) the City's process for evaluating inclusion of green infrastructure; and (3) green infrastructures planned for selected projects. Technologies to be considered shall, at a minimum, include those listed under the aforementioned Green Initiative Special Condition.

Maintenance/enhancement projects for historic designated facilities/structures are exempt from this Special Condition.

d. Payne and Fayette Sewer Separation

Within 90 days of the permit effective date, the permittee shall submit a plan and schedule for this project with the eventual goal of removing ninety-two (92) sanitary sewer connections within the CSS and reconnecting them directly to the Potomac Yard Trunk Sewer. The permittee shall have completed a minimum of sixty (60) reconnections by the end of this permit term.

The permittee shall submit progress updates with the annual reports until completion of this separation project.

e. Outfall Improvements

The permittee shall further evaluate alternatives being considered for improvements at Outfall 003 and Outfall 004 and submit a Preliminary Engineering Report to DEQ for review and approval once the final alternative is selected and prior to beginning enhancements. The permittee shall implement its proposed improvements at Outfall 003 and Outfall 004 on or before 23 February 2016.

9. Green Maintenance

The permittee shall establish, or alternatively incorporate, a database to manage information on all green infrastructure practices put in place that are owned and/or maintained by the City. The database shall schedule and track maintenance activities to ensure infrastructures are maintained for proper performance. The permittee shall submit to DEQ two updates on the status of the database development. The first update shall be provided on or before 23 August 2014 and the second on or before 23 August 2015. On or before 23 August 2016, the permittee shall submit to DEQ a final report detailing the full database development and implementation.

10. Annual Bacteria Load Reporting

The permittee shall report the estimated total annual loading of *E. coli* from each outfall for each calendar year. The permittee shall utilize a combination of monitoring data along with modeling results to calculate the estimated total annual bacteria loadings into the receiving streams. The event mean concentrations (ECMs) established in the Hunting Creek Bacteria MDL shall be utilized to compute the loadings. These EMCs may be re-evaluated if monitoring data supports updating these values. Any revised EMC values shall be documented and submitted to DEQ-NRO staff for review and approval.

This reporting requirement shall be included in the annual reports.

11. Evaluation of Tidal Intrusion at Outfall 002

On or before 23 August 2014, the permittee shall submit to DEQ for review and approval a report evaluating tidal intrusion at Outfall 002; identifying warranted corrective actions to minimize or prevent such intrusion. At a minimum, the report shall include (1) estimates of tidal intrusion rates observed at Outfall 002 at disparate tidal conditions, (2) an analysis of the intrusion impacts on limiting the available volume for storage in the collection system and flow maximization to the wastewater treatment plant during wet weather events and (3) operational actions and/or feasible engineering controls needed to minimize tidal intrusion within generally accepted CSS operations based on actual local conditions.

The report shall include a plan and schedule for implementation of recommended alternatives, if identified, as necessary by the report.

Upon DEQ approval, necessitated actions and implementation schedule acknowledged in the report are incorporated by reference and become enforceable under this permit.

12. Annual Reports

The permittee shall submit to DEQ-NRO for review and comment annual reports for the previous calendar year. These reports shall include, but not limited to:

a. Modeled results of the number of CSO occurrences and duration;
b. CSS structure inspections and maintenance;
c. Outfall inspections;
d. Staff training records;
e. Street sweeping;
f. Catch basin cleaning;
g. CSS trunk sewer flushing;
h. Dry weather discharge inspections;
i. Capital expenditures regarding CSO abatements;
j. Summary of monitoring results for Outfalls 001, 002, 003 and 004 as applicable;
k. Stormwater and *E. Coli* loading management;
l. Status of Green Infrastructure projects evaluated and implemented;
m. Payne and Fayette sewer separation project update;
n. Outfall 003/004 progress report;
o. Summary of model updates and calibration data collected during the year, including flow metering data;
p. Annual bacteria loadings; and
q. LTCPU updates.

This report shall be due on or before 31st of March of every year commencing for calendar year 2014, due 31 March 2015.

13. Water Quality Standards Compliance

The permittee may not discharge in excess of any effluent limitation necessary to meet applicable water quality standards imposed under the State Water Control Law or the Clean Water Act.

14. Total Maximum Daily Load (TMDL) Reopener

This permit shall be modified or alternatively revoked and reissued if any approved wasteload allocation procedure, pursuant to Section 303(d) of the Clean Water Act, imposes wasteload allocations, limits or conditions on the facility that are not consistent with the permit requirements.

CONDITIONS APPLICABLE TO ALL VPDES PERMITS

A. Monitoring.

1. Samples and measurements taken as required by this permit shall be representative of the monitored activity.

2. Monitoring shall be conducted according to procedures approved under Title 40 Code of Federal Regulations Part 136 or alternative methods approved by the U.S. Environmental Protection Agency, unless other procedures have been specified in this permit.

3. The permittee shall periodically calibrate and perform maintenance procedures on all monitoring and analytical instrumentation at intervals that will insure accuracy of measurements.

4. Samples taken as required by this permit shall be analyzed in accordance with 1VAC30-45, Certification for Noncommercial Environmental Laboratories, or 1VAC30-46, Accreditation for Commercial Environmental Laboratories.

B. Records.

1. Records of monitoring information shall include:

   a. The date, exact place, and time of sampling or measurements;

   b. The individual(s) who performed the sampling or measurements;

   c. The date(s) and time(s) analyses were performed;

   d. The individual(s) who performed the analyses;

   e. The analytical techniques or methods used; and

   f. The results of such analyses.

2. Except for records of monitoring information required by this permit related to the permittee's sewage sludge use and disposal activities, which shall be retained for a period of at least five years, the permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least 3 years from the date of the sample, measurement, report or application. This period of retention shall be extended automatically during the course of any unresolved litigation regarding the regulated activity or regarding control standards applicable to the permittee, or as requested by the Board.

C. Reporting Monitoring Results.

1. The permittee shall submit the results of the monitoring required by this permit not later than the 10th day of the month after monitoring takes place, unless another reporting schedule is specified elsewhere in this permit. Monitoring results shall be submitted to:

   Department of Environmental Quality - Northern Regional Office (DEQ-NRO)
   13901 Crown Court
   Woodbridge, VA 22193

   Monitoring results shall be reported on a Discharge Monitoring Report (DMR) or on forms provided, approved or specified by the Department.

2. If the permittee monitors any pollutant specifically addressed by this permit more frequently than required by this permit using test procedures approved under Title 40 of the Code of Federal Regulations Part 136 or using other test procedures approved by the U.S. Environmental Protection Agency or using procedures specified in this permit, the results of this monitoring shall be included in the calculation and reporting of the data submitted in the DMR or reporting form specified by the Department.

3. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified in this permit.

D. Duty to Provide Information.

The permittee shall furnish to the Department, within a reasonable time, any information which the Board may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with this permit. The Board may require the permittee to furnish, upon request, such plans, specifications, and other pertinent information as may be necessary to determine the effect of the wastes from this discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of the State Water Control Law. The permittee shall also furnish to the Department upon request, copies of records required to be kept by this permit.

E. Compliance Schedule Reports.

Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than 14 days following each schedule date.

F. Unauthorized Discharges.

Except in compliance with this permit, or another permit issued by the Board, it shall be unlawful for any person to:

1. Discharge into state waters sewage, industrial wastes, other wastes, or any noxious or deleterious substances; or

2. Otherwise alter the physical, chemical or biological properties of such state waters and make them detrimental to the public health, or to animal or aquatic life, or to the use of such waters for domestic or industrial consumption, or for recreation, or for other uses.

G. Reports of Unauthorized Discharges.

Any permittee who discharges or causes or allows a discharge of sewage, industrial waste, other wastes or any noxious or deleterious substance into or upon state waters in violation of Part II.F.; or who discharges or causes or allows a discharge that may reasonably be expected to enter state waters in violation of Part II.F., shall notify the Department of the discharge immediately upon discovery of the discharge, but in no case later than 24 hours after said discovery. A written report of the unauthorized discharge shall be submitted to the Department, within five days of discovery of the discharge. The written report shall contain:

1. A description of the nature and location of the discharge;

2. The cause of the discharge;

3. The date on which the discharge occurred;

4. The length of time that the discharge continued;

5. The volume of the discharge;

6. If the discharge is continuing, how long it is expected to continue;

7. If the discharge is continuing, what the expected total volume of the discharge will be; and

8. Any steps planned or taken to reduce, eliminate and prevent a recurrence of the present discharge or any future discharges not authorized by this permit.

Discharges reportable to the Department under the immediate reporting requirements of other regulations are exempted from this requirement.

H. Reports of Unusual or Extraordinary Discharges.

If any unusual or extraordinary discharge including a bypass or upset should occur from a treatment works and the discharge enters or could be expected to enter state waters, the permittee shall promptly notify, in no case later than 24 hours, the Department by telephone after the discovery of the discharge. This notification shall provide all available details of the incident, including any adverse affects on aquatic life and the known number of fish killed.
The permittee shall reduce the report to writing and shall submit it to the Department within five days of discovery of the discharge in accordance with Part II.I.2. Unusual and extraordinary discharges include but are not limited to any discharge resulting from:

1. Unusual spillage of materials resulting directly or indirectly from processing operations;

2. Breakdown of processing or accessory equipment;

3. Failure or taking out of service some or all of the treatment works; and

4. Flooding or other acts of nature.

I. Reports of Noncompliance.

The permittee shall report any noncompliance which may adversely affect state waters or may endanger public health.

1. An oral report shall be provided within 24 hours from the time the permittee becomes aware of the circumstances. The following shall be included as information which shall be reported within 24 hours under this paragraph:

   a. Any unanticipated bypass; and

   b. Any upset which causes a discharge to surface waters.

2. A written report shall be submitted within 5 days and shall contain:

   a. A description of the noncompliance and its cause;

   b. The period of noncompliance, including exact dates and times, and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and

   c. Steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

   The Board may waive the written report on a case-by-case basis for reports of noncompliance under Part II.I. if the oral report has been received within 24 hours and no adverse impact on state waters has been reported.

3. The permittee shall report all instances of noncompliance not reported under Parts II, I.1.or I.2., in writing, at the time the next monitoring reports are submitted. The reports shall contain the information listed in Part II.I.2.

NOTE: The immediate (within 24 hours) reports required in Parts II, G., H. and I. may be made to the Department's Northern Regional Office at (703) 583-3800 (voice) or (703) 583-3821 (fax). For reports outside normal working hours, leave a message and this shall fulfill the immediate reporting requirement. For emergencies, the Virginia Department of Emergency Services maintains a 24-hour telephone service at 1-800-468-8892.

J. Notice of Planned Changes.

1. The permittee shall give notice to the Department as soon as possible of any planned physical alterations or additions to the permitted facility. Notice is required only when:

   a. The permittee plans alteration or addition to any building, structure, facility, or installation from which there is or may be a discharge of pollutants, the construction of which commenced:

      1) After promulgation of standards of performance under Section 306 of Clean Water Act which are applicable to such source; or

2) After proposal of standards of performance in accordance with Section 306 of Clean Water Act which are applicable to such source, but only if the standards are promulgated in accordance with Section 306 within 120 days of their proposal;

b. The alteration or addition could significantly change the nature or increase the quantity of pollutants discharged. This notification applies to pollutants which are subject neither to effluent limitations nor to notification requirements specified elsewhere in this permit; or

c. The alteration or addition results in a significant change in the permittee's sludge use or disposal practices, and such alteration, addition, or change may justify the application of permit conditions that are different from or absent in the existing permit, including notification of additional use or disposal sites not reported during the permit application process or not reported pursuant to an approved land application plan.

2. The permittee shall give advance notice to the Department of any planned changes in the permitted facility or activity which may result in noncompliance with permit requirements.

K. Signatory Requirements.

1. All permit applications shall be signed as follows:

a. For a corporation: by a responsible corporate officer. For the purpose of this section, a responsible corporate officer means:

1) A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or

2) The manager of one or more manufacturing, production, or operating facilities employing mo re than 250 persons or having gross annual sales or expenditures exceeding $25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

b. For a partnership or sole proprietorship: by a general partner or the proprietor, respectively; or

c. For a municipality, state, federal, or other public agency: by either a principal executive officer or ranking elected official. For purposes of this section, a principal executive officer of a public agency includes:

1) The chief executive officer of the agency, or

2) A senior executive officer having responsibility for the overall operations of a principal geographic unit of the agency.

2. All reports required by permits, and other information requested by the Board shall be signed by a person described in Part II.K.1., or by a duly authorized representative of that person. A person is a duly authorized representative only if:

a. The authorization is made in writing by a person described in Part II.K.1.;

b. The authorization specifies either an individual or a position having responsibility for the overall operation of the regulated facility or activity such as the position of plant manager, operator of a well or a well field, superintendent, position of equivalent responsibility, or an individual or position having overall responsibility for environmental matters for the company. (A duly authorized representative may thus be either a named individual or any individual occupying a named position.); and

c. The written authorization is submitted to the Department.

3. Changes to authorization. If an authorization under Part II.K.2. is no longer accurate because a different individual or position has responsibility for the overall operation of the facility, a new authorization satisfying the requirements of Part II.K.2. shall be submitted to the Department prior to or together with any reports, or information to be signed by an authorized representative.

4. Certification. Any person signing a document under Parts II, K.1. or K.2. shall make the following certification:

> "I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

L. Duty to Comply.

The permittee shall comply with all conditions of this permit. Any permit noncompliance constitutes a violation of the State Water Control Law and the Clean Water Act, except that noncompliance with certain provisions of this permit may constitute a violation of the State Water Control Law but not the Clean Water Act. Permit noncompliance is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

The permittee shall comply with effluent standards or prohibitions established under Section 307(a) of the Clean Water Act for toxic pollutants and with standards for sewage sludge use or disposal established under Section 405(d) of the Clean Water Act within the time provided in the regulations that establish these standards or prohibitions or standards for sewage sludge use or disposal, even if this permit has not yet been modified to incorporate the requirement.

M. Duty to Reapply.

If the permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the permittee shall apply for and obtain a new permit. All permittees with a currently effective permit shall submit a new application at least 180 days before the expiration date of the existing permit, unless permission for a later date has been granted by the Board. The Board shall not grant permission for applications to be submitted later than the expiration date of the existing permit.

N. Effect of a Permit.

This permit does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorize any injury to private property or invasion of personal rights, or any infringement of federal, state or local law or regulations.

O. State Law.

Nothing in this permit shall be construed to preclude the institution of any legal action under, or relieve the permittee from any responsibilities, liabilities, or penalties established pursuant to any other state law or regulation or under authority preserved by Section 510 of the Clean Water Act. Except as provided in permit conditions on "bypassing" (Part II.U.), and "upset" (Part II.V.) nothing in this permit shall be construed to relieve the permittee from civil and criminal penalties for noncompliance.

P. Oil and Hazardous Substance Liability.

Nothing in this permit shall be construed to preclude the institution of any legal action or relieve the permittee from any responsibilities, liabilities, or penalties to which the permittee is or may be subject under Sections 62.1-44.34:14 through 62.1-44.34:23 of the State Water Control Law.

Q. Proper Operation and Maintenance.

The permittee shall at all times properly operate and maintain all facilities and systems of treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance also includes effective plant performance, adequate funding, adequate staffing, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of back-up or auxiliary facilities or similar systems which are installed by the permittee only when the operation is necessary to achieve compliance with the conditions of this permit.

R. Disposal of solids or sludges.

Solids, sludges or other pollutants removed in the course of treatment or management of pollutants shall be disposed of in a manner so as to prevent any pollutant from such materials from entering state waters.

S. Duty to Mitigate.

The permittee shall take all reasonable steps to minimize or prevent any discharge or sludge use or disposal in violation of this permit which has a reasonable likelihood of adversely affecting human health or the environment.

T. Need to Halt or Reduce Activity not a Defense.

It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

U. Bypass.

1. "Bypass" means the intentional diversion of waste streams from any portion of a treatment facility. The permittee may allow any bypass to occur which does not cause effluent limitations to be exceeded, but only if it also is for essential maintenance to assure efficient operation. These bypasses are not subject to the provisions of Parts II, U.2. and U.3.

2. Notice

   a. Anticipated bypass. If the permittee knows in advance of the need for a bypass, prior notice shall be submitted, if possible at least ten days before the date of the bypass.

   b. Unanticipated bypass. The permittee shall submit notice of an unanticipated bypass as required in Part II.I.

3. Prohibition of bypass.

   a. Bypass is prohibited, and the Board may take enforcement action against a permittee for bypass, unless:

      1) Bypass was unavoidable to prevent loss of life, personal injury, or severe property damage;

      2) There were no feasible alternatives to the bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, or maintenance during normal periods of equipment downtime. This condition is not satisfied if adequate back-up equipment should have been installed in the exercise of reasonable engineering judgment to prevent a bypass which occurred during normal periods of equipment downtime or preventive maintenance; and

      3) The permittee submitted notices as required under Part II.U.2.

   b. The Board may approve an anticipated bypass, after considering its adverse effects, if the Board determines that it will meet the three conditions listed above in Part II.U.3.a.

V. Upset.

1. An upset constitutes an affirmative defense to an action brought for noncompliance with technology based permit effluent limitations if the requirements of Part II.V.2. are met. A determination made during administrative review of claims that noncompliance was caused by upset, and before an action for noncompliance, is not a final administrative action subject to judicial review.

2. A permittee who wishes to establish the affirmative defense of upset shall demonstrate, through properly signed, contemporaneous operating logs, or other relevant evidence that:

   a. An upset occurred and that the permittee can identify the cause(s) of the upset;

   b. The permitted facility was at the time being properly operated;

   c. The permittee submitted notice of the upset as required in Part II.I.; and

   d. The permittee complied with any remedial measures required under Part II.S.

3. In any enforcement preceding the permittee seeking to establish the occurrence of an upset has the burden of proof.

W. Inspection and Entry.

The permittee shall allow the Director, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:

1. Enter upon the permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and

4. Sample or monitor at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Clean Water Act and the State Water Control Law, any substances or parameters at any location.

For purposes of this section, the time for inspection shall be deemed reasonable during regular business hours, and whenever the facility is discharging. Nothing contained herein shall make an inspection unreasonable during an emergency.

X. Permit Actions.

Permits may be modified, revoked and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance does not stay any permit condition.

Y. Transfer of permits.

1. Permits are not transferable to any person except after notice to the Department. Except as provided in Part II.Y.2., a permit may be transferred by the permittee to a new owner or operator only if the permit has been modified or revoked and reissued, or a minor modification made, to identify the new permittee and incorporate such other requirements as may be necessary under the State Water Control Law and the Clean Water Act.

2. As an alternative to transfers under Part II.Y.1., this permit may be automatically transferred to a new permittee if:

   a. The current permittee notifies the Department at least 30 days in advance of the proposed transfer of the title to the facility or property;

b. The notice includes a written agreement between the existing and new permittees containing a specific date for transfer of permit responsibility, coverage, and liability between them; and

c. The Board does not notify the existing permittee and the proposed new permittee of its intent to modify or revoke and reissue the permit. If this notice is not received, the transfer is effective on the date specified in the agreement mentioned in Part II.Y.2.b.

Z. Severability.

The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstance is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

Attachment B

City of Alexandria Combined Sewer System VPDES Fact Sheet

This document provides pertinent information concerning the reissuance of the VPDES Permit listed below. This permit is being processed as a major, municipal permit. The discharges result from the combined sewer system (CSS) during wet weather events at overflow points within the collection system; referred to as combined sewer overflows (CSOs). The requirements and special conditions contained within this permit are in accordance with 9VAC25-31-50.C. and the Clean Water Act, CSO Control Policy, Section 402(q)(1).

1. Facility Name and Mailing Address:	Alexandria Combined Sewer System 301 King Street, Room 4100 Alexandria, VA 22313	SIC Code:	4952 WWTP
Facility Location:	The combined sewer system serves a 540 acre area of the City of Alexandria. See **Attachment 1.**	City:	Alexandria
Facility Contact Name:	Rashad Young / City Manager	Telephone Number:	703-746-4300
2. Permit No.:	VA0087068	Expiration Date:	15 January 2012
Other VPDES Permits:	Not Applicable		
Other Permits:	VAR040057 – Phase II MS4 General Permit		
E2/E3/E4 Status:	Not Applicable		
3. Owner Name:	City of Alexandria		
Owner Contact / Title:	Richard Baier / Director of Transportation and Environmental Services	Telephone Number:	703-746-4019
4. Application Complete Date:	15 July 2011		
Permit Drafted By:	Douglas Frasier	Date Drafted:	22 October 2012 16 November 2012 22 January 2013 13 February 2013 13 March 2013 14 May 2013 20 May 2013
Draft Permit Reviewed By:	Alison Thompson	Date Reviewed:	26 November 2012
WPM Review By:	Bryant Thomas	Date Reviewed:	11 November 2012 24 January 2013 27 February 2013 14 March 2013 15 May 2013 21 May 2013
Public Comment Period:	Start Date: 12 July 2013	End Date:	12 August 2013

5. Receiving Waters Information:

Receiving Stream Names:	Outfall 001:	Oronoco Bay	Stream Codes:	Outfall 001:	1aPOT
	Outfall 002:	Hunting Creek		Outfall 002:	1aHUT
	Outfall 003/004:	Hooffs Run		Outfall 003/004:	1aHFF
Drainage Areas:	Outfall 001:	224 acres	River Miles:	Outfall 001:	108.72
	Outfall 002:	184 acres		Outfall 002:	0.60
	Outfall 003/004:	132 acres		Outfall 003/004:	0.70 / 0.63
Stream Basins:	Potomac River		Subbasins:	Potomac River	
Sections:	Outfall 001/002:	06	Stream Classes:	Outfall 001/002:	II
	Outfall 003/004:	07		Outfall 003/004:	III

Special Standards:	Outfall 001/002: b,y Outfall 003/004: b	Waterbody IDs:	Outfall 001: VAN-A12E Outfall 002: VAN-A13E Outfall 003/004: VAN-A13R

Outfall 001 / Outfall 002 / Outfall 003 / Outfall 004

7Q10 Low Flow:	Not Applicable*	7Q10 High Flow:	Not Applicable*
1Q10 Low Flow:	Not Applicable*	1Q10 High Flow:	Not Applicable*
30Q10 Low Flow:	Not Applicable*	30Q10 High Flow:	Not Applicable*
Harmonic Mean Flow:	Not Applicable*	30Q5 Flow:	Not Applicable*

*Overflows only occur during wet weather events. The flow within the receiving streams would be highly variable; dependent upon the previous precipitation event, amount/type of precipitation and longevity of the event. A mixing zone determination is not feasible.

6. Statutory or Regulatory Basis for Special Conditions and Effluent Limitations:

✓	State Water Control Law	✓	EPA Guidelines
✓	Clean Water Act	✓	Water Quality Standards
✓	VPDES Permit Regulation	✓	Other: CSO Control Policy
✓	EPA NPDES Regulation		CWA Section 402(q)(1)

7. Licensed Operator Requirements: Not Applicable

8. Reliability Class: Not Applicable

9. Permit Characterization:

	Private		Effluent Limited	✓	Possible Interstate Effect
	Federal	✓	Water Quality Limited		Compliance Schedule
	State		Whole Effluent Toxicity Program		Interim Limits in Permit
✓	POTW		Pretreatment Program		Interim Limits in Other Document
✓	TMDL				

10. Wastewater Sources and Treatment Description:

A combined sewer system (CSS) is a wastewater collection system that conveys wastewaters (domestic, commercial and industrial) and stormwater via a single pipe. Normally, the system transports all of the wastewater to a publicly owned treatment works (POTW) for treatment. However, these types of collection systems are designed to overflow at certain points in the system during rainfall or snowmelt events when the volume of water exceeds the capacity of the collection system and/or the treatment capacity of the POTW. A combined sewer overflow (CSO) refers to CSS discharges at these points in the collection system. The CSOs discharge a mixture of stormwater, untreated human and industrial waste, possible toxic materials and debris into a water body during wet weather events.

The City of Alexandria CSS serves approximately 540 acres with a population of approximately 25,000. The majority of the sewershed is located in the Old Town area and consists of 6.2 miles of combined sewers with four (4) outfalls. During dry weather, all sanitary wastewaters are conveyed to the AlexRenew Water Resource Recovery Facility (VA0025160) for treatment. This treatment plant is owned and operated by the City of Alexandria, Virginia Sanitation Authority.

Dry weather discharges from a CSS are strictly prohibited under the Combined Sewer Overflow Control Policy.

Outfall locations and brief descriptions:

Outfall 001: Pendleton Street Outfall
Location: east end of Pendleton Street
Minimum rainfall for overflow event: approximately 0.06 inches

The wastewater flow originates from the North and South Trunks of the Pendleton Street Trunk Sewer, flowing into the Potomac Interceptor. The regulator structure is a diagonal weir, discharging through two flapper valve tide gates.

Outfall 002: Royal Street Outfall
Location: south end of Royal Street
Minimum rainfall for overflow event: approximately 0.21 inches

This point in the CSS receives flow from the Royal Street Trunk Sewer, with all dry weather flow entering the Potomac Interceptor. The regulator is a 6 inch weir.

Outfall 003: King/West Streets Outfall
Location: under Duke Street at the crossing of Hooffs Run
Minimum rainfall for overflow event: approximately 0.03 inches

This outfall and regulator are located in a box culvert that runs under Duke Street. Flows in this section of the CSS come from the Peyton Street Trunk Sewer and then to the Commonwealth Interceptor.

Outfall 004: Hooffs Run Outfall
Location: approximately 50 meters south of Duke Street
Minimum rainfall for overflow event: approximately 0.16 inches

The regulator structure consists of an overflow weir upstream of inverted siphons; outfall structure is a flapper valve.

See **Attachment 2** for a map illustrating the locations of the outfalls.

The national framework for control of CSOs is found in the Environmental Protection Agency's (EPA) *Combined Sewer Overflow (CSO) Control Policy*, published on 19 April 1994 and later incorporated into the Clean Water Act, Section 402(q)(1) in 2000. This policy established a comprehensive and consistent approach for controlling discharges from CSOs.

The goals of the Policy are to:

- Ensure that if CSOs occur, they are only as a result of wet weather;
- Bring all wet weather CSO discharge points into compliance with the technology-based and water quality-based requirements of the Clean Water Act; and
- Minimize the impacts of CSOs on water quality, aquatic biota and human health.

The policy requires communities with CSOs to prepare a Long Term Control Plan (LTCP) detailing how they will accomplish these goals. The overall approach regarding the LTCP consists of three steps: system characterization, development and evaluation of alternatives and selection/implementation of the controls. In February 1999, the City of Alexandria's LTCP, consisting of the nine minimum controls (Section 17.e.), was approved by DEQ. The City of Alexandria elected to demonstrate that the controls in place would meet the Water Quality Standards by means of modeling. These tools were used to ascertain the frequency, duration and volume of CSO discharges. In addition, these models were used to predict the possible impacts on the receiving streams.

The 2006 305(b)/303(d) Water Quality Assessment Report stated that Hunting Creek did not support the Recreation Use and the Fish Consumption Use due to bacteria and polychlorinated biphenyls (PCBs), respectively. Outfall 002 discharges directly into Hunting Creek while Outfall 003 and Outfall 004 discharge to a tributary to Hunting Creek. Total Maximum Daily Loads (TMDLs) have been developed and approved for both impairments. This system has been identified as a source within each document. Please refer to Section 15 of this Fact Sheet for further details.

Point source components for TMDLs are implemented through the VPDES permitting programs while nonpoint source controls are implemented via a combination of best management practices (BMPs), state and/or local regulations.

TABLE 1
OUTFALL DESCRIPTION

Number	Number of CSO Events*	Average Duration of Overflow*	Average Volume of Overflow*	Estimated Annual Volume of Overflow**	Latitude / Longitude
001	28	2.32 hours	1.36 million gallons	35.21 million gallons	38° 48′ 35″ / 77° 02′ 19″
002	25	1.92 hours	1.41 million gallons	31.27 million gallons	38° 47′ 30″ / 77° 02′ 49″
003	58	6.05 hours	0.66 million gallons	36.67 million gallons	38° 48′ 15″ / 77° 03′ 33″
004	28	8.04 hours	0.27 million gallons	9.63 million gallons	38° 48′ 13″ / 77° 03′ 34″

*Approximations; per permit application, dated 8 July 2011, for the time period of June 2010 – May 2011.

**2011 Annual Report Model Summary

See **Attachment 3** for the Alexandria topographic map.

11. **Sludge Treatment and Disposal Methods:** Not Applicable. There is no sludge generated within this system.

12. **Discharges and Monitoring Stations Located within Waterbodies VAN-A12E, VAN-A13E and VAN-A13R:**

TABLE 2
DISCHARGES & MONITORING STATIONS

ID / Permit Number	Facility Name	Type	Receiving Stream
VAN-A12E			
VAR051790	USPS – Maintenance Yard	Stormwater General Permits	Four Mile Run, UT
VAR051097	WMATA Four Mile Run Bus Garage		Four Mile Run
VAR051001	Robinson Terminal Warehouse		Potomac River
VAR051421	Arlington County Water Pollution Control Facility		Four Mile Run
VAR050997	Red Top Cab		Potomac River
VA0032000	US Department of Defense – Pentagon	Minor Industrial Discharge	Roaches Run
VA0025143	Arlington County Water Pollution Control Facility	Major Municipal Discharge	Four Mile Run
VAN-A13E			
1aHUT000.01	DEQ ambient monitoring station		
VA0025160	Alexandria Renew Enterprise WTP	Major Municipal Discharge	Hunting Creek
VAG110086	Virginia Concrete Company, Inc. – Alexandria	Ready-Mix Concrete General Permit	Hooffs Run
VAG756000	Falls Church Liberty	Carwash General Permit	Tripps Run
VAN-A13R			
VA0090107	Carlyle Development II	Minor Industrial Discharge	Old Cameron Run
VAG110009	Virginia Concrete Company, Inc. – Springfield	Ready-Mix Concrete General Permit	Backlick Run, UT Indian Run, UT

TABLE 2 (continued)			
VAN-A13R			
VAG830281	Fannon Petroleum Service	Petroleum General Permits	Hooffs Run
VAG830406	Shell 24501141808 – Skyhill		Cameron Run, UT
VAG830090	Aalans Service, Inc.		Tripps Run
VAG250107	GBA Associates – Annex Building	Cooling Water General Permits	Holmes Run
VAG250091	GBA Associates Limited Partnership		
VAG750124	Enterprise Rent A Car – Alexandria	Carwash General Permit	Holmes Run, UT

13. **Material Storage:** Not Applicable. There are no chemicals utilized or stored at this facility.

14. **Site Inspection:** Performed by DEQ-NRO Compliance Staff on 22 February 2012 (see **Attachment 4**).

Subsequent inspection conducted at AlexRenew Water Resource Recovery Facility and the City of Alexandria CSS by EPA Region III Enforcement Branch on 26 and 27 June 2012 (DEQ Compliance and Permitting Staff were present). See **Attachment 5** for the inspection report minus exhibits and attachments.

15. **Receiving Stream Water Quality and Water Quality Standards:**

a. Ambient Water Quality Data

Outfall 001:

This waterbody flows into the Potomac River, which, at this specific location, is under the jurisdiction of the District of Columbia. There is no DEQ monitoring data available for this receiving stream; however, the City was required to conduct ambient monitoring of Oronoco Bay during the last permit term. See **Attachment 6** for the monitoring locations and **Attachment 7** for the monitoring data.

A bacteria TMDL for this portion of the Potomac River was completed in July 2004 by the District Department of the Environment. No specific wasteload allocation was assigned to the City of Alexandria Combined Sewer System under this TMDL. Virginia was assigned a wasteload allocation as a whole, to be apportioned amongst all contributors.

Outfall 002:

The closest DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 0.28 rivermiles from Outfall 002.

The City has conducted extensive ambient monitoring of Hunting Creek during the last two permit terms. See **Attachment 8** for the monitoring location and **Attachment 9** for data collected during the last permit term.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for Hunting Creek has been completed and was approved by EPA on 10 November 2010. Outfall 002 was assigned a wasteload allocation of 6.26E+13 cfu/year for *E. coli* bacteria; representing an 80% reduction of current bacteria loadings from this outfall.

The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life sub-use; the thirty day mean is acceptable. However, the seven day mean and instantaneous levels have not been assessed.

The wildlife use is considered fully supporting.

Outfalls 003/004:

There are no DEQ monitoring stations located on Hooffs Run. The closest downstream DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 1.29 and 1.22 rivermiles downstream from Outfall 003 and Outfall 004, respectively.

E. coli monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. A bacteria TMDL for Hunting Creek has been completed and was approved by EPA on 10 November 2010. Wasteload allocations of 6.26E+13 and 8.52E+11 cfu/year for *E. coli* bacteria were assigned to Outfall 003 and Outfall 004, respectively. This represents a 99% reduction of current bacteria loadings at each outfall.

The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life sub-use; the thirty day mean is acceptable. However, the seven day mean and instantaneous levels have not been assessed.

The wildlife use is considered fully supporting.

All Outfalls:

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. A PCB TMDL for the tidal Potomac River watershed has been completed and was approved by EPA on 31 October 2007. The City of Alexandria CSS was identified as a source of PCBs in the TMDL but no reductions in loadings are required in the TMDL.

There is a downstream impairment noted for aquatic life use for the Chesapeake Bay. There is a completed TMDL and all sources were included. The CSS was included in the watershed implementation plan (WIP) submitted to EPA on 29 November 2011. Essentially, wasteload allocations assigned to this CSS equates to the current Long Term Control Plan consisting of the Nine Minimum Controls.

See **Attachment 10** for the full planning statement.

b. Receiving Stream Water Quality Criteria

Part IX of 9VAC25-260-(360-550) designates classes and special standards applicable to defined Virginia river basins and sections. Table 3 provides the receiving stream, section number, river basin and stream classification for each respective outfall.

TABLE 3

Outfall	Receiving Stream	Section Number	River Basin	Stream Classification
001	Oronoco Bay	06	Potomac	II
002	Hunting Creek	06	Potomac	II
003/004	Hooffs Run	07	Potomac	III

Class II tidal waters in the Chesapeake Bay and it tidal tributaries must meet dissolved oxygen concentrations as specified in 9VAC25-260-185 and maintain a pH of 6.0 – 9.0 standard units as specified in 9VAC25-260-50. In the Northern Virginia area, Class II waters must meet the Migratory Fish Spawning and Nursery Designated Use from February 1 through May 31. For the remainder of the year, these tidal waters must meet the Open Water use. The applicable dissolved oxygen criteria concentrations are presented **Attachment 11.**

At all times, Class III waters must achieve a dissolved oxygen (D.O.) of 4.0 mg/L or greater, a daily average D.O. of 5.0 mg/L or greater, a temperature that does not exceed 32° C and maintain a pH of 6.0 – 9.0 standard units (S.U.).

c. Receiving Stream Special Standards

The State Water Control Board's Water Quality Standards, River Basin Section Tables (9VAC25-260-360, 370 and 380) designates the river basins, sections, classes and special standards for surface waters of the Commonwealth of Virginia. The receiving streams at Outfall 001 and Outfall 002, Oronoco Bay and Hunting Creek, respectively, are located within Section 06 of the Potomac River Basin. This section has been designated with special standards of "b" and "y".

The receiving stream at Outfall 003 and Outfall 004, Hooffs Run, is located within Section 07 of the Potomac River Basin. This section has been designated with a special standard of "b".

Special Standard "b" (Potomac Embayment Standards) established effluent standards for all sewage plants discharging into Potomac River embayments and for expansions of existing plants discharging into non-tidal tributaries of these embayments. 9VAC25-415, Policy for the Potomac Embayments controls point source discharges of conventional pollutants into the Virginia embayment waters of the Potomac River, and their tributaries, from the fall line at Chain Bridge in Arlington County to the Route 301 bridge in King George County. The regulation sets effluent limits for BOD_5, total suspended solids, phosphorus and ammonia to protect the water quality of these high profile waterbodies.

The Potomac Embayment Standards are not applicable to these discharges since combined sewer overflows were explicitly exempted (9VAC25-415-30).

Special Standard "y" is the chronic ammonia criterion for tidal freshwater Potomac River and tributaries that enter the tidal freshwater Potomac River from Cockpit Point (below Occoquan Bay) to the fall line at Chain Bridge. During November 1 through February 14 of each year the thirty-day average concentration of total ammonia nitrogen (in mg/L) shall not exceed, more than once every three years on the average the following chronic ammonia criterion:

$$\left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) \times 1.45(10^{0.028(25-MAX)})$$

MAX = temperature in °C or 7, whichever is greater.

The default design flow for calculating steady state waste load allocations for this chronic ammonia criterion is the 30Q10, unless statistically valid methods are employed which demonstrate compliance with the duration and return frequency of this water quality criterion.

The Special Standard "y" is not applicable to these discharges since combined sewer overflows are intermittent by design; only the acute criterion would apply.

d. Threatened or Endangered Species

The Virginia DGIF Fish and Wildlife Information System Database was searched on 25 August 2011 for records to determine if there are threatened or endangered species in the vicinity of the discharge. The following threatened and endangered species were identified within a 2 mile radius of the outfalls: Brook Floater (mussel); Grizzled Skipper (butterfly); Bald Eagle; and Migrant Loggerhead Shrike (song bird). The monitoring and special conditions proposed in this draft permit protect the threatened and endangered species found near the discharge.

The stream that the facility discharges to is within a reach identified as having an Anadromous Fish Use. It is staff's best professional judgment that the proposed monitoring and special conditions will ensure protection of this use.

16. Antidegradation (9VAC25-260-30):

All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

This reissuance involves four (4) outfalls discharging into three (3) different receiving streams. The receiving streams have been classified as Tier 1 based on the fact that all are listed as impaired and given the highly developed urban watersheds. The proposed permit monitoring requirements and special conditions have been developed per the CSO Control Policy which will result in attaining and/or maintaining all water quality criteria which apply to the receiving streams, including narrative criteria.

17. Effluent Screening, Wasteload Allocations and Effluent Monitoring Development:

To determine water quality-based effluent limitations for a discharge, the suitability of data must first be determined. Data is suitable for analysis if one or more representative data points are equal to or above the quantification level ("QL") and the data represent the exact pollutant being evaluated.

a. Effluent Screening

Monitoring data obtained during the last permit term at each outfall has been reviewed and determined to be suitable for evaluation.

Please see **Attachment 12** for a summary of the monitoring data for all outfalls.

The following pollutants require a wasteload allocation analysis: ammonia, copper and zinc.

b. Wasteload Allocations (WLAs)

Discharge events from the City Of Alexandria CSS only occur during wet weather events. The stormwater subsequently increases the volume of water conveyed beyond the POTW's design capacity and the storage capability of the conveyance system. Since the duration of the discharge is not likely to exceed four days during a discharge event, only the acute criteria need to be discussed.

Water Quality Criteria (WQC) for human health and chronic toxicity are based upon long term, continuous exposure and are believed not applicable to this type of intermittent discharge.

Further, it is staff's best professional judgement to establish acute wasteload allocations by multiplying the acute water quality criteria by a factor of 2 unless site specific dilution data is available. The two times factor is derived from acute criteria being defined as one half of the final acute value (FAV) for a specific toxic pollutant. The FAV is determined from exposure of a specific toxicant to a variety of aquatic species and is based on the level of a chemical or mixture of chemicals that does not allow the mortality or other specified response of aquatic organisms. These criteria represent maximum pollutant concentration values, which when exceeded, would cause acute effects on aquatic life in a short time period.

Please see **Attachment 13** for the derived WLA for each outfall. It should be noted that the actual stream and discharge flows do not equate to 1 MGD as presented in the computations. These values are utilized to calculate the wasteload allocations while simulating tidal conditions; thus, obtaining the aforementioned two times factor.

Since Hooffs Run is an urban stream, draining a highly developed area and there is no available ambient data, it was staff's best professional judgement to utilize pH and temperature data from Hunting Creek monitoring results in order to calculate the WLAs for Outfall 003 and Outfall 004. The basis for this rationale is that Hunting Creek is ultimately the receiving stream for these two outfalls and the distance between the stream and the outfalls is less than one (1) mile.

c. Toxic Pollutants

1). Ammonia as N:

Staff evaluated the outfall monitoring data obtained during the last permit term and compared those results with the calculated acute wasteload allocations (WLAs). Staff found that all data points were below the acute WLAs for ammonia. It is staff's best professional judgement that these discharges do not pose a reasonable potential to cause or contribute to a violation of the ammonia criteria at this time. However, the permittee shall continue analyzing ammonia levels at each outfall during this permit term in order to monitor any potential increase in this pollutant and potential impacts on the receiving streams.

See **Attachment 12** for outfall monitoring results that were detected above the laboratory quantification level (QL) and **Attachment 13** for the subsequent WLA calculations.

2). Total Residual Chlorine:

Currently, there is no disinfection at any of the four (4) outfalls; therefore, a reasonable potential assessment for chlorine is not warranted.

3). Metals/Organics:

Monitoring data for all outfalls necessitated a reasonable potential analysis for copper and zinc since the sampling results were found above the quantification levels.

Data from Outfall 001, Outfall 003 and Outfall 004 indicates that neither metal is currently a pollutant of concern at these discharge points. All data points were below the acute WLA for both metals.

Outfall 002 data indicates that the copper values ascertained during monitoring may be a pollutant of concern; conversely, zinc is not a pollutant of concern at this outfall. Subsequent analysis will be completed by DEQ staff after submission of monitoring data.

See **Attachment 14** for the metal analyses for each outfall.

d. Effluent Monitoring Summary

Effluent monitoring requirements are presented in the following table. Monitoring requirements were established for pH, carbonaceous-biochemical oxygen demand ($cBOD_5$), total suspended solids (TSS), dissolved oxygen (DO), total kjeldahl nitrogen (TKN), ammonia as N, *E. coli*, nitrate+nitrite, total nitrogen (TN), total phosphorus (TP), chlorides, total recoverable zinc, total recoverable copper, rainfall amount, rainfall duration and duration of discharges.

e. Nine Minimum Controls (NMCs)

This permit requires continued implementation of the nine minimum controls (current approved LTCP), as set forth in the CSO Control Policy:

1). Conduct Proper Operations and Regular Maintenance Programs.

The permittee shall continue to implement the operation and maintenance plan for the combined sewer system (CSS) that includes the elements listed below. The permittee shall update the plan to incorporate any changes to the system and shall operate and maintain the system accordingly.

(a) Designation of a Manager for the CSS.

The permittee shall designate a person to be responsible for the wastewater collection system.

(b) Inspection and Maintenance of CSS.

The permittee shall inspect and maintain all CSO structures, regulators and tide gates to ensure proper working condition, adjusted to minimize CSOs and tidal inflow. The permittee shall inspect each CSO outfall at an appropriate frequency to ensure no dry weather overflows are occurring. The inspection shall include, but is not limited to, entering the regulator structure if accessible, determining the extent of debris and grit buildup and removing any debris that may constrict flow, cause blockage or result in a dry weather overflow. The permittee shall record in a maintenance log book the results of the inspections. For CSO outfalls that are inaccessible, the permittee may perform a visual check of the overflow pipe to determine whether or not the CSO is occurring during dry weather flow conditions.

(c) Provision for Trained Staff.

The permittee shall continue to ensure the availability of trained staff to complete the operation, maintenance, repair and testing functions required to comply with the terms and conditions of this permit.

(d) Allocation of Funds for O&M.

The permittee shall allocate adequate funds specifically for operation and maintenance (O&M) activities. The permittee shall ensure the necessary funds, equipment and personnel have been committed to carry out the O&M plan for the next fiscal year.

2). Maximize Use of the Collection System for Storage.

The permittee shall maximize the in-line storage capacity of the CSS. The permittee shall maintain all dams or diversion structures; minimize discharges from the CSS outfalls; and maintain maintenance records.

3). Control of Non-Domestic Discharges.

The permittee shall continue to implement selected CSO controls to minimize the impact of non-domestic discharges.

4). Maximize Flow to the Publicly Owned Treatment Works (POTW).

The permittee shall convey, to the greatest extent practicable, all wet weather flows to the POTW within the constraints of the CSS and the capacity of the POTW. The POTW is owned, operated and maintained by the City of Alexandria, Virginia Sanitation Authority and is regulated under a separate VPDES permit (VA0025160). The permittee shall maintain records to document these actions.

5). Prohibit Combined Sewer Overflows during Dry Weather.

Dry weather overflows from CSS outfalls are prohibited. Dry weather flow conditions shall mean the flow in a combined sewer that results from sanitary sewage, industrial wastewater and infiltration/inflow; with no contribution from stormwater runoff or stormwater induced infiltration.

All dry weather overflows must be reported to DEQ-NRO and the local health department within 24 hours of acknowledgement. The permittee shall begin corrective action immediately, monitor the dry weather overflow until the overflow has been eliminated and shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, estimated discharge volume and corrective measures taken.

6). Control Solid and Floatable Materials.

The permittee shall implement measures to control solid and floatable materials in the CSS. Such measures shall include, but not limited to, regular catch basin and street cleaning within the CSS sewershed, cleaning of trunk lines and structures and consideration of entrapment and baffling devices.

7). Develop and Implement Pollution Prevention Program.

The permittee shall continue to implement the pollution prevention (P2) program to reduce the impact of CSOs on receiving waters. The permittee shall maintain records to document the pollution prevention implementation activities. Specific P2 measures include street sweeping and catch basin cleaning, household hazard waste recycling program and a waste oil and antifreeze recycling/referral service program.

8). Public Notification.

The permittee shall continue to implement a public notification plan to inform citizens of when and where CSOs occur. The permittee shall ensure that identification signs at all CSS outfalls are maintained and easily readable by the public.

9). CSO Monitoring.

The permittee shall regularly monitor CSO outfalls to effectively characterize CSO impacts and the efficacy of CSO controls.

18. Antibacksliding:

All limits in this permit are at least as stringent as those previously established. Backsliding does not apply to this reissuance.

19. Effluent Monitoring Requirements:

CSS Outfalls 001/002/003/004

Effective Dates: During the period beginning with the permit's effective date and lasting until the expiration date.

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NA	NA	NA	NL	1/Q	Estimate
pH	3	NA	NA	NL S.U.	NL S.U.	1/Q	Grab
$cBOD_5$	2	NA	NA	NA	NL mg/L	1/Q	Grab
Total Suspended Solids (TSS)	2	NA	NA	NA	NL mg/L	1/Q	Grab
Dissolved Oxygen (DO)	2	NA	NA	NL mg/L	NA	1/Q	Grab
Total Kjeldahl Nitrogen (TKN)	2	NA	NA	NA	NL mg/L	1/Q	Grab
Ammonia, as N	2	NA	NA	NA	NL mg/L	1/Q	Grab
*E. coli**	2	NA	NA	NA	NL n/100 mL	1/Q	Grab
Oil & Grease	2	NA	NA	NA	NL mg/L	1/Q	Grab
Nitrate+Nitrite, as N	2	NA	NA	NA	NL mg/L	1/Q	Grab
Total Nitrogen**	2	NA	NA	NA	NL mg/L	1/Q	Calculated
Total Phosphorus	2	NA	NA	NA	NL mg/L	1/Q	Grab
Chlorides	2	NA	NA	NA	NL mg/L	1/Q	Grab
Zinc, Total Recoverable	2	NA	NA	NA	NL µg/L	1/Q	Grab
Copper, Total Recoverable	2	NA	NA	NA	NL µg/L	1/Q	Grab
Rainfall	2	NA	NL inches	NA	NA	1/Q	Measured
Rainfall Duration	2	NA	NL hours	NA	NA	1/Q	Recorded
Duration of Discharge	2	NA	NL hours	NA	NA	1/Q	Estimate

The basis for the limitations codes are:

1. Federal Effluent Requirements
2. Best Professional Judgement
3. Water Quality Standards

MGD = Million gallons per day.

NA = Not applicable.

NL = No limit; monitor and report.

S.U. = Standard units.

1/Q = Once every calendar quarter.

Estimate = Reported flow is to be based on the technical evaluation of the sources contributing to the discharge.

Grab = An individual sample collected over a period of time not to exceed 15-minutes.

*Report as concentration per monitored discharge event.

The CSS shall comply with the bacteria wasteload allocations assigned under the Hunting Creek Bacteria TMDL (See Section 15.a.) at Outfalls 002/003/004 as soon as possible (9VAC25-31-250.A.1.).

The schedule of compliance will be governed and enforced via the DEQ approved Long Term Control Plan Update (Section 21.d.).

** Total Nitrogen = Sum of TKN plus Nitrate+Nitrite

Each outfall shall be monitored during the following calendar year:
Year 2014 – Outfall 001; Year 2015 – Outfall 002; Year 2016 – Outfall 003; and Year 2017 – Outfall 004

Beginning in Year 2018, the permittee shall repeat the aforementioned monitoring schedule, or an alternate monitoring plan approved by DEQ, until such time a new permit is reissued.

The quarterly monitoring periods shall be January through March, April through June, July through September and October through December.

20. Other Permit Requirements:

a. Permit Section Part I.B. contains quantification levels and compliance reporting instructions.

9VAC25-31-190.L.4.c. requires an arithmetic mean for measurement averaging and 9VAC25-31-220.D. requires limits be imposed where a discharge has a reasonable potential to cause or contribute to an in-stream excursion of water quality criteria. Specific analytical methodologies for toxics are listed in this permit section as well as quantification levels (QLs) necessary to demonstrate compliance with applicable permit limitations or for use in future evaluations to determine if the pollutant has reasonable potential to cause or contribute to a violation. Required averaging methodologies are also specified.

b. Permit Section Part I.C. details the requirements for Verification of Modeled Events.

The City of Alexandria has applied modeling software since the late 1980s to evaluate the response of the CSS to wet weather events. Several updates have been completed since early model development. The purpose of the model is to possess the ability to characterize the system in order to predict the number and amount of overflows based on the precipitation amount.

The permittee shall continue to update and calibrate as necessary the model, utilizing monitoring data, in order to ascertain the number of overflows and pollutant loadings into each receiving waters.

c. Permit Section Part I.D. requires continuing implementation of the current Long Term Control Plan.

The permittee's Long Term Control Plan (LTCP) was approved by DEQ in February 1999. The developed LTCP consists of the nine minimum technology-based requirements of the CSO Control Policy. The permittee shall continue implementing the current approved LTCP until such time the update is approved by DEQ (Section 21.d.).

21. Other Special Conditions:

a. Water Quality Criteria Reopener. The VPDES Permit Regulation at 9VAC25-31-220.D. requires establishment of effluent limitations to ensure attainment/maintenance of receiving stream water quality criteria. Should effluent monitoring indicate the need for any water quality-based limitations, this permit may be modified or alternatively revoked and reissued to incorporate appropriate limitations.

b. No New Combined Sewers Requirement. No new combined sewers shall be built outside the existing combined sewer system service areas of the City. This requirement shall not be construed to prevent the connection of new sanitary sewers to combined sewers within the existing combined sewer service are for the purpose of conveying sewage to the POTW. No new connections shall be made to the combined sewers where those connections would cause overflows during dry-weather flow conditions or exacerbate CSO events.

c. Reopener Clause. This permit may be modified or revoked and reissued, as provided pursuant to 40 CFR 122.62 and 124.5, for the following reasons:

1). To include new or revised conditions developed to comply with any State or Federal law or regulation that addresses CSOs that is adopted or promulgated subsequent to the effective date of this permit.

2). To include new or revised conditions if new information, not available at the time of permit reissuance, becomes available that would lead to the attainment of Virginia Water Quality Standards.

3). To include new or revised conditions based on new information resulting from implementation of the long term control plan.

d. Long Term Control Plan Update (LTCPU). The permittee shall develop a Long Term Control Plan Update (LTCPU) which will set forth an implementation plan to comply with the approved Hunting Creek Bacteria Total Maximum Daily Load (TMDL) as soon as practicable; however, no later than 31 December 2035. The LTCPU will also provide for combined sewer overflow controls to comply with all applicable water quality standards for the receiving waters (*EPA Guidance for LTCP, September 1995*), consistent with the Clean Water Act Section 402(q) and State Water Control Law. The permittee will be required to submit a LTCPU for DEQ review and approval within three (3) years of the permit effective date. A work plan outlining the schedule for developing the LTCPU will be required within nine (9) months of the permit effective date. The updated LTCP will, at a minimum, consist of measureable milestones to achieve the bacteria reductions as set forth in the aforementioned TMDL.

The City proposed a three (3) year timeline for completing the LTCPU. This allows for a value-engineered approach for mitigating the overflows while engaging all concerned parties. It also recognizes that there will be significant development and implementation of CSO control actions and measures during this permit term. Specifically, (1) green infrastructure projects will be installed and evaluated to determine effectiveness and possible incorporation into the LTCPU; (2) a sewer separation project will commence, with the ultimate goal of disconnecting ninety-two (92) sanitary connections from the combined sewer system and rerouting the flows to a separate sanitary sewer system; and (3) outfall improvements will be required with the goal of capturing additional wet weather flow. Ultimately, the permittee must obtain a reduction in bacteria loading either by at least a 5 million gallon annual reduction of stormwater entering the CSS or equivalent *E. coli* load reduction via gray and green engineering projects, during this permit term.

DEQ staff concurred that a three (3) year schedule for preparing the LTCPU is appropriate, considering that the permittee will be evaluating various alternatives to comply with the bacteria TMDL and engaging the public while concurrently completing projects that will reduce the overall amount of overflows that occur during wet weather events during the next five (5) years. The proposed conditions and requirements incorporate a regulatory framework instituting a dual approach to developing and implementing CSO controls which are complimentary to short and long term initiatives. The short term programs will achieve CSO reductions during this permit term while the long term is to ultimately achieve compliance with the Hunting Creek bacteria TMDL, including all applicable water quality standards, with the development of the LTCPU. It should be noted that the programs instituted during this permit term will also aide to inform final decisions to be incorporated into the Long Term Control Plan Update.

As discussed above, the regulatory approach incorporated into the draft permit includes both near term and long term requirements, each with associated goals and outcomes. DEQ supports this path forward as it both achieves results in the short term, while also ultimately ensuring compliance with water quality standards. Once finalized, the LTCPU will be required to be fully implemented in less than twenty (20) years in order to meet the 2035 compliance date. This proposed schedule is based upon the nature of the remaining CSS. It is recognized that the remainder of the combined sewershed occupies a relatively small drainage area compared to other systems across the nation. However, it serves a densely populated, highly developed, historic and complex area that encompasses the Old Town area of Alexandria; further presenting new challenges for the installation of controls and sewer separation. It is estimated that over the implementation period, approximately 10% of Old Town, affecting residents and businesses alike, could experience disruptions at any one time if total separation of the sanitary and storm sewers would occur. Separation projects have and may require rebuilding utilities beyond the planned sewer work. There is an extensive prevalence of underground utilities, past land uses with possible contaminants and plausible economic impacts to businesses and the City to consider while evaluating alternatives to mitigate the overflows. Furthermore, the CSS is only one part of a regional wastewater collection system involving Alexandria Renew Enterprises and a portion of Fairfax County, which will require the City to engage with these entities as viable options are evaluated since any action taken by the City would affect the system as a whole. Finally, it should be noted that the proposed timeline reflects those found in other communities that have legacy combined sewers.

Staff anticipates that sewer separation will be the primary mechanism for achieving compliance with the bacteria TMDL requirements. The LTCPU implementation schedule reflects this understanding. However, it is also recognized that ultimate compliance with water quality standards will likely entail a mutual approach to CSO controls involving technical, engineering solutions as well as integrated gray and green infrastructure. This reflects EPA's integrated approach to stormwater and wastewater permitting and planning in combined sewersheds (**Attachments 15** and **16**). It also emulates the Administrative Order for Compliance on Consent between EPA and the City of Philadelphia Water Department and the City of Philadelphia (http://www.phillywatersheds.org/doc/EPA_Signed_%20AOCC.pdf).

It is staff's expectation that if viable alternatives are available that would allow for a completion date prior to above, the permittee would pursue those options.

e. Additional Public Notification Requirements. In addition to the requirements in Section 17.e.8., the permittee shall publish all reports on the City's combined sewer web page, notify citizens of CSO conditions semiannually and install universal pictograms at each outfall location.

f. Public Information Meeting. The permittee shall conduct public informational meetings during the development of the LTCPU and prior to submitting the final for DEQ approval (Section 21.d.). These meetings shall be conducted within 18 and 36 months of the permit effective date, respectively. These meetings shall, at a minimum, explain combined sewer systems, the impacts on surface waters, progress to date on minimizing the impacts and the proposed LTCPU milestones/schedule in order to comply with the Hunting Creek TMDL.

The permittee shall conduct these meetings at such times as to maximize public participation for comments and inquiries.

g. Funding. The permittee shall outlay a minimum of $2,500,000 during this permit term for CSO abatement projects. The permittee shall include updates detailing fund expenditures during the previous time period and future, planned expenditures with each annual report.

h. Stormwater and *E. coli* Loading Management. The permittee shall, at a minimum, implement the following five programs to achieve a reduction of 5 million gallons of stormwater entering the CSS, or the *E. coli* equivalent, annually by the end of this permit term. This reduction represents approximately one-half of the 2011 estimated overflow volume at Outfall 004 or 4% of the estimated annual total for the whole system.

1) Combined Sewer Service Area Reduction Plan (ARP)

The ARP, dated December 2005 (updated May 2013), requires the separation of storm and sanitary sewers associated with most development/redevelopment projects within the CSS sewershed. The permittee has been implementing this policy outside of the permit. The ARP and any future amendments are now incorporated by reference and become enforceable under this permit.

Activities associated with the ARP are dependent upon economic and market forces and are not necessarily controlled by the City; therefore, a formal schedule is not possible. Staff recognizes as redevelopment occurs, separation will be required. The ARP compliments the aforementioned LTCPU, ensuring compliance with water quality standards.

The permittee shall submit reports annually detailing ongoing and proposed redevelopment projects. If a project did not include separation, the permittee shall submit a thorough explanation within the report.

2) Green Initiative

The permittee shall study, implement and promote green infrastructure projects within the CSS sewershed during this permit term. The rationale for this special condition is to reduce the inflow of stormwater during wet weather events. This requirement does not require development/redevelopment projects; rather, the permittee shall undertake an active role in completing projects during this permit term. Projects evaluated shall include, but not limited to: rainfall harvesting, permeable pavements, rain gardens, green roof installation, bioretention cells, urban forestation/reforestation and public education.

3) Green Public Facilities

As an extension of the City's Green Building Policy and to further enhance stormwater management, the permittee shall incorporate green infrastructure into maintenance/enhancement projects at all city facilities (offices, schools, libraries etc) located within the CSS sewershed. Technologies to be considered shall, at a minimum, include those listed under the aforementioned Green Initiative. The permittee will submit proposed projects for each coming fiscal year with the annual reports.

Maintenance/enhancement projects for historic designated facilities/structures are exempt from this Special Condition.

4) Payne and Fayette Sewer Separation

Within 90 days of the permit effective date, the permittee shall submit a plan and schedule for this separation project. This project will ultimately remove ninety-two (92) sanitary sewer connections within the CSS area and reconnecting them directly to the Potomac Yard Trunk Sewer. The permittee shall complete a minimum of sixty (60) reconnections during this permit term.

The permittee shall submit progress updates with the annual reports until completion of this separation project.

5) Outfall Improvements

The permittee shall further evaluate alternatives being considered and shall submit a Preliminary Engineering Report to DEQ once the final alternative is selected. The permittee shall implement its proposed improvements at Outfall 003 and Outfall 004 within 30 months of the permit effective date. The alternatives include weir and structural enhancements to improve captured combined flows, further reduce the likelihood of dry weather overflows and facilitate maintenance.

i. Green Maintenance. The permittee shall establish a database to manage information on all green infrastructure practices put in place that are owned and/or maintained by the City. The database shall schedule and track maintenance activities to ensure that the infrastructures are maintained for proper performance. The permittee shall submit updates within 12 and 24 months of the permit effective date concerning the development of this system. A final report shall be submitted within 36 months detailing the full database development and implementation.

j. Annual Loading Reporting. The permittee shall report the total estimated annual loading of *E. coli* from each outfall for each calendar year. The permittee shall utilize a combination of monitoring data along with modeling results to calculate the total estimated annual bacteria loadings into the receiving streams. The event mean concentrations (EMCs) established in the Hunting Creek Bacteria TMDL shall be utilized to compute the loadings. These EMCs may be re-evaluated if monitoring data supports updating these values. Any revised EMC values shall be documented and submitted to DEQ-NRO staff for review and approval. This reporting requirement shall be included in the annual reports.

k. Evaluation of Tidal Intrusion at Outfall 002. The permittee shall monitor and evaluate the tidal intrusion into the collection system at Outfall 002 as noted by the EPA inspection conducted in June 2012. The permittee shall review potential alternatives, if necessary, to minimize or eliminate the intrusion. This report will be due within 12 months of the permit effective date for DEQ review and approval.

l. Annual Reports. The permittee shall submit to DEQ-NRO for review and comment annual reports for the previous calendar year. These reports will be due March 31st of every year detailing the previous year's operation and maintenance of system, updates for the above projects and updates regarding the LTCPU status.

m. Water Quality Standards. The permittee may not discharge in excess any effluent limitations necessary to meet applicable water quality standards, including those imposed under the State Water Control Law. The conditions in this permit for the discharges from the CSS are necessary to meet the applicable water quality standards.

n. TMDL Reopener. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL that may be developed and approved for the receiving stream.

22. Permit Section Part II. Part II of the permit contains standard conditions that appear in all VPDES Permits. In general, these standard conditions address the responsibilities of the permittee, reporting requirements, testing procedures and records retention.

23. **Changes to the Permit from the Previously Issued Permit:**

a. The following Special Conditions were added with this reissuance:

- Long Term Control Plan Update (LTCPU)
- Additional Public Notification Requirements
- Public Information Meeting
- Funding
- Stormwater and *E. coli* Loading Management
- Green Maintenance
- Annual Loading Reporting
- Evaluation of Tidal Intrusion at Outfall 002
- Annual Reports

b. Effluent Monitoring:

- The monitoring requirements for antimony, cadmium, chromium III, chromium VI, lead, mercury, nickel and selenium were removed. Sampling results from the past two permit terms indicate that these metals are not present in appreciable amounts.

c. Other:

- Reporting requirements for rainfall and rainfall duration were included with this reissuance.
- Ambient monitoring requirements were removed with this reissuance. The permittee has collected and reported monitoring data for Hunting Creek during the previous two (2) permit terms and concurrent monitoring of Oronoco Bay during the last permit term. This has provided a substantial amount of data that has been utilized in each subsequent reissuance and for the Hunting Creek Bacteria TMDL development.

Furthermore, since the designated use impairments have been noted for the receiving waters, additional data would not provide significant information at this time. Future permit terms may require ambient monitoring as the LTCPU is implemented.

24. Variances/Alternate Limits or Conditions: None.

25. Public Notice Information:

First Public Notice Date: 11 July 2013 Second Public Notice Date: 18 July 2013

Public Notice Information is required by 9VAC25-31-280 B. All pertinent information is on file and may be inspected and copied by contacting the: DEQ Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193; Telephone No. 703-583-3873; Douglas.Frasier@deq.virginia.gov. See **Attachment 17** for a copy of the public notice document.

Persons may comment in writing or by email to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address and telephone number of the writer and of all persons represented by the commenter/requester and shall contain a complete, concise statement of the factual basis for comments. Only those comments received within this period will be considered. The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state 1) the reason why a hearing is requested; 2) a brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and 3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective, unless the DEQ grants a public hearing. Due notice of any public hearing will be provided. The public may request an electronic copy of the draft permit and fact sheet or review the draft permit and application at the DEQ Northern Regional Office by appointment.

26. Additional Comments:

Previous Board Action(s):	None.
Staff Comments:	This reissuance was delayed due to consequential discussions among the City of Alexandria, Department of Environmental Quality and Environmental Protection Agency regarding specific permit conditions and requirements in relation to the Hunting Creek Bacteria TMDL wasteload allocations and the subsequent implementation and timeframe for compliance.
Public Comment:	Two organizations, Friends of Dyke Marsh and Potomac Riverkeeper, submitted comments during the public notice period; neither requested a hearing. Draft permit comments and subsequent staff responses are included in **Attachment 18**. Two citizens submitted generalized questions and comments; which, staff was able to respond satisfactorily. Email exchanges are also located in **Attachment 18**.
EPA Checklist:	The checklist can be found in **Attachment 19**.
	Attachment 20 contains EPA comments and subsequent DEQ responses concerning the first EPA Region III review of the Draft permit in April 2013.

Fact Sheet Attachments

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City of Alexandria Combined Sewer System
VA0087068
2013 Reissuance

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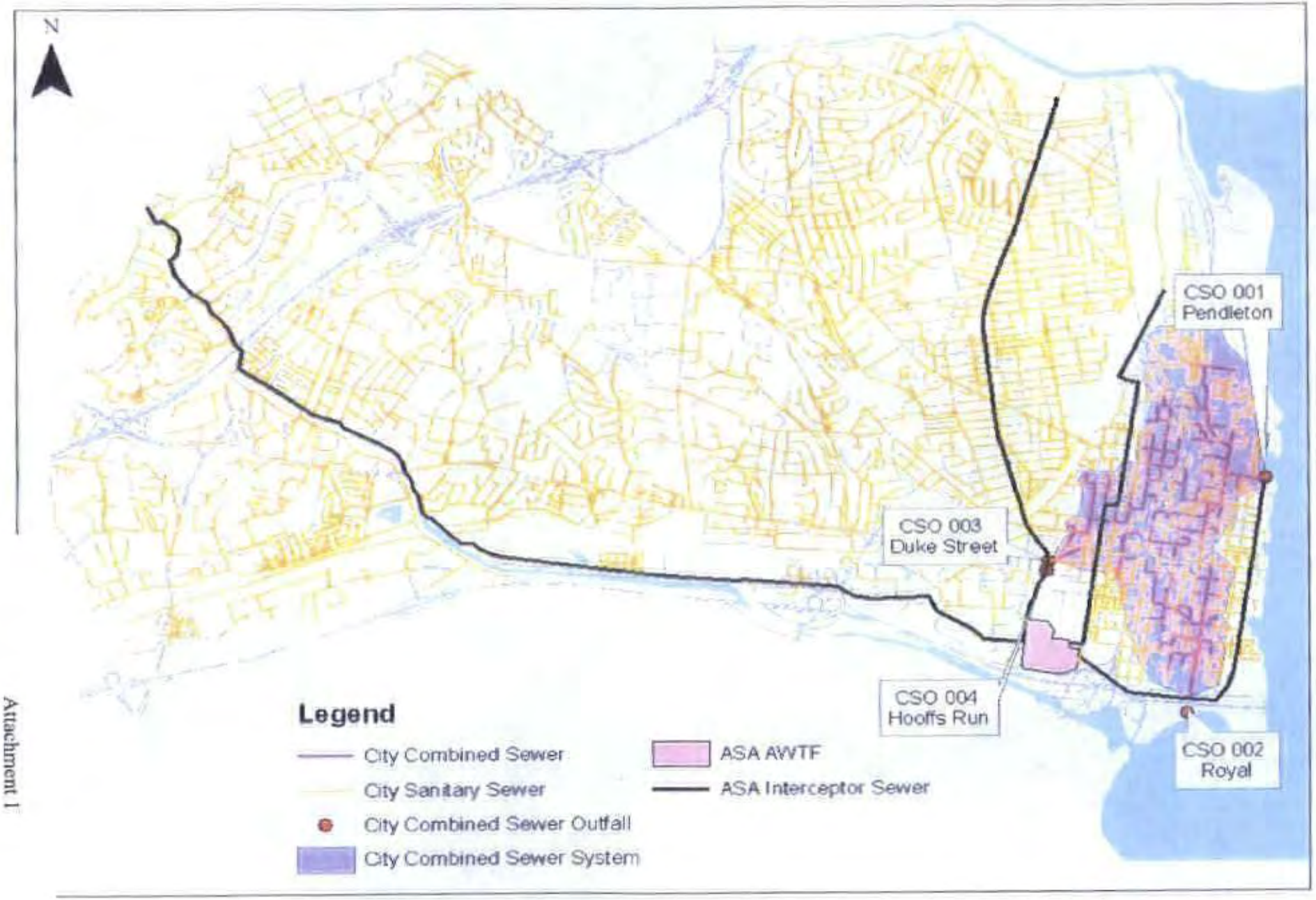
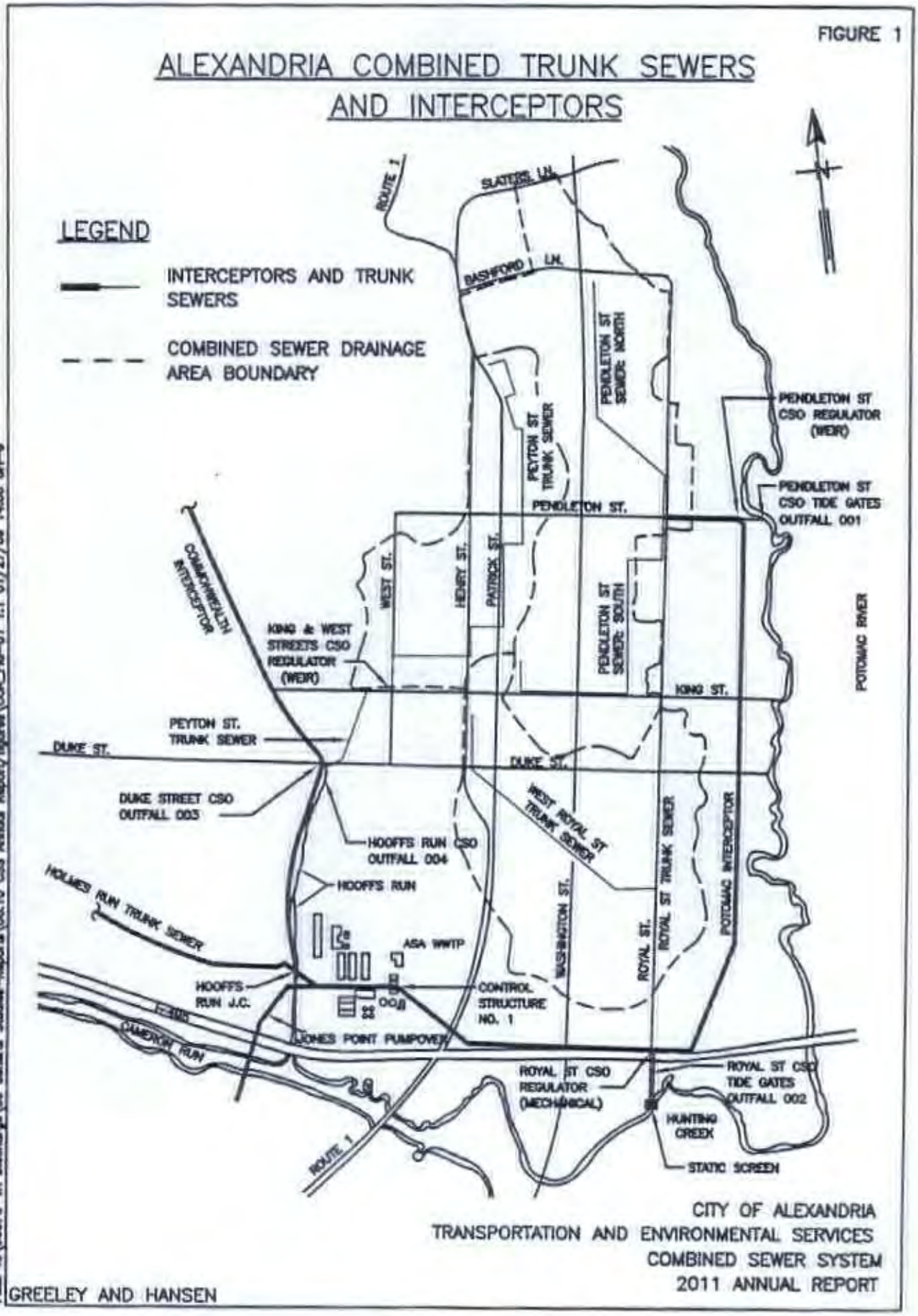


Attachment 1

FIGURE 1

ALEXANDRIA COMBINED TRUNK SEWERS AND INTERCEPTORS



CITY OF ALEXANDRIA
TRANSPORTATION AND ENVIRONMENTAL SERVICES
COMBINED SEWER SYSTEM
2011 ANNUAL REPORT

GREELEY AND HANSEN

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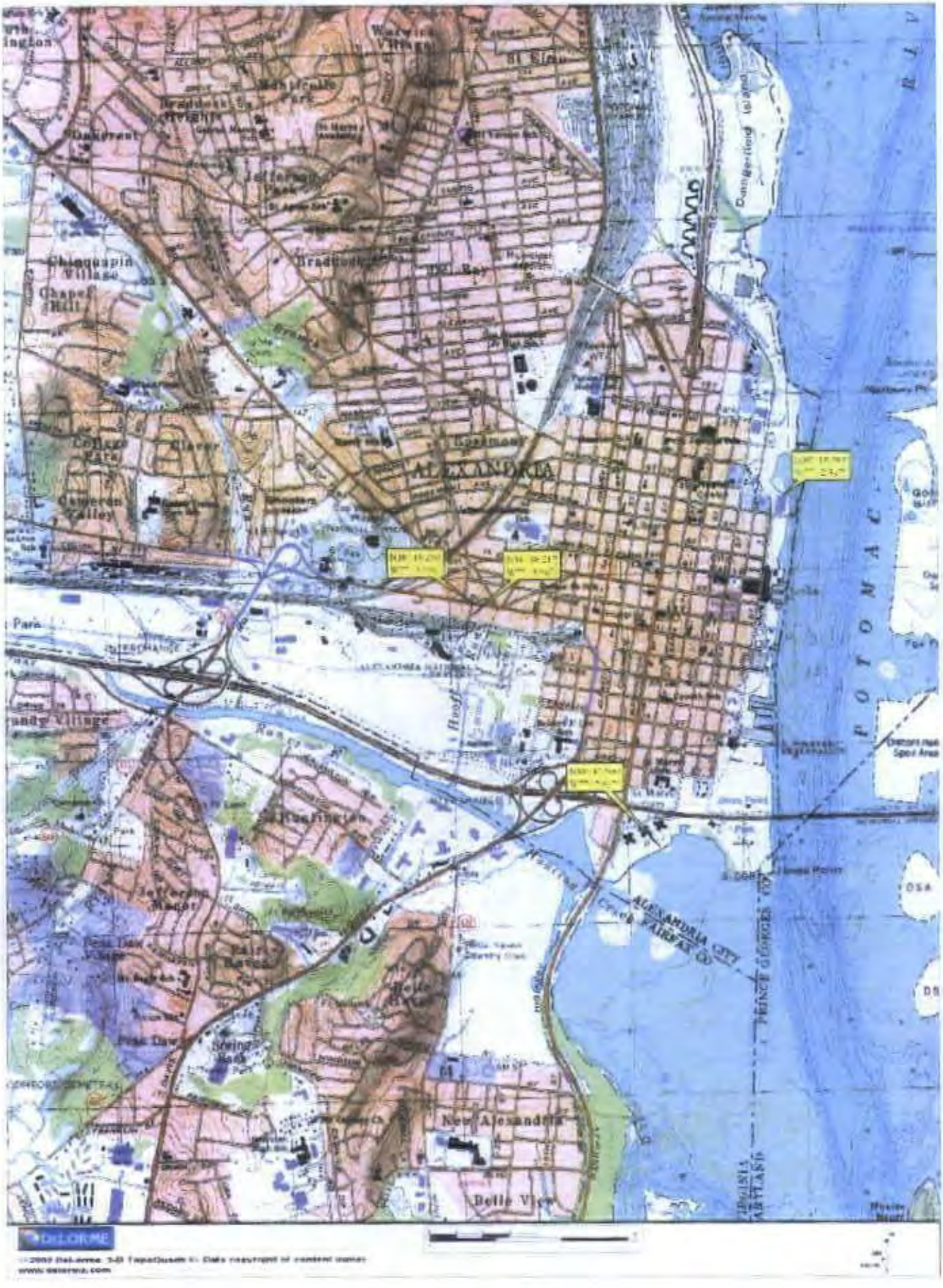

Attachment 3

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

- Mr. Frasier and I met representatives for the City of Alexandria, Greeley and Hansen, and the Alexandria Sanitary Authority at City Hall in the Twin Cities conference room.
- Mr. Sharma presented a short slide presentation overview of the Combined Sewer System (CSS).
- The City of Alexandria continues to require that new developments separate wastewater and stormwater sewer lines as part of development approval. Biggest one- Potomac Yard- trunk sewer installed. New development connects to sanitary trunk sewer rather than adding to the CSS.
- New developments planned for waterfront will be connected to the Potomac Interceptor, and will not affect CSS.

Monitoring

- In accordance with the 2007 monitoring plan, in 2011 staff collected in-stream samples only, none from permitted outfalls.
- Samples collected by Dustin Dvorak (Greeley & Hansen) and sent to Martel Lab in Baltimore for analysis. Two samples per year are split and "QC samples" are sent to another lab to check Martel's results.
- Toured outfalls- no discharge from any.

Outfall PS 001- Pendleton St.

- When sample collected- take boat out to old pier pilings to collect.

PS 002- Royal St.

- ASA maintains regulator.
- Sewer gate is float activated based on water level in sanitary sewer.
- Some tidewater intrusion at high tide.
- Manholes have been raised and new lids installed (hydraulic so they don't come crashing down).
- Racks at overflow gate are checked and cleaned regularly, especially before and after storm events.
- Silt fence was installed above this outfall because run off from the bridge construction project was sending a lot of sediment into embayment. A lot of the silt fence is down- needs to be removed or replaced.

PS 003 – Duke St.

- Not observed- not observable - Confined Space.

PS 004- Hoofs Run

- Regulator is located in manhole in middle of Duke Street- could not observe w/out disrupting traffic.
- Some algae growth at outfall- although appears to be more of result of SW outfall just downstream from Outfall 004.

INSPECTION OVERVIEW AND CONDITION OF TREATMENT UNITS

9 Minimum Standards: I reviewed the 2010 Annual Report (submitted March 2011) for this inspection.

Conduct Proper Operations and Regular Maintenance Programs.

a. Designation of a Manager for the CSS: **Mr. Richard J. Baier, P.E., Director, Transportation and Environmental Services**

b. Inspection and Maintenance of CSS.

i) The permittee shall ensure monthly inspection and maintenance of all outfalls, tide gates, diversion and regulator structures within the CSS. **Y**

ii) The permittee shall inspect each CSS outfall twice a month to confirm that no dry weather overflows are occurring. **Y**

iii) The permittee shall maintain records of inspections and maintenance for all aforementioned structures. **Y**

c. Provision for Trained Staff **Y**

d. Allocation of funds for O&M **Y**

Maximize Use of the Collection System for Storage

a. Maintain all dams or diversion structures at or exceeding their current heights **Y**

b. Minimize discharges from the CSS outfalls by maximizing the storage capacity **Y**

c. Keep maintenance records **Y**

Control of Non-domestic Discharges

a. Maintain records documenting this evaluation and implementation of the selected CSO controls to minimize CSO impacts resulting from non-domestic discharges. **Y**

b. Requiring Significant Industrial Users (SIU) discharging to the CSS to minimize batch discharges during wet weather conditions. **The 2010 annual report states that there are no Significant Industrial Users or remediated dischargers within the CSS.**

c. Continued control of illicit dischargers and/or improper disposal to the CSS via detection and elimination. **Illicit discharges are prohibited via city ordinances.**

Maximize Flow to POTW

a. The City details ongoing efforts to reduce connections between the stormwater sewer and sanitary sewer as described in the annual report to DEQ. **Y. No new separation projects completed since the submission of the 2011 annual report, but there are several on-going projects.**

Prohibit Combined Sewer Overflows during Dry Weather

a. All dry weather overflows must be reported to DEQ and the local health department within 24 hours of when the permittee becomes aware of a dry weather overflow. **Y**
No dry weather overflows reported in 2010 or 2011.

b. Upon becoming aware of an overflow, the permittee shall begin corrective action immediately. The permittee shall monitor the dry weather overflow until the overflow has been eliminated. **Y**

c. The permittee shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, discharge volume and corrective measures taken. **Y**

U.S. Environmental Protection Agency
Office of Compliance and Enforcement
1200 Pennsylvania Avenue, NW
Washington, DC 20460

U.S. Environmental Protection Agency, Region 3
1650 Arch Street
Philadelphia, PA 19103

COMBINED SEWER SYSTEM COMPLIANCE INSPECTION AND ASSESSMENT OF NINE MINIMUM CONTROLS

CITY OF ALEXANDRIA & ALEXANDRIA RENEW ENTERPRISES

INSPECTION REPORT

Inspection Dates:
June 26-27, 2012

Report Date:
December 27, 2012

Attachment 5

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Exhibit 2: Photograph Log

ATTACHMENTS

Attachment A: VPDES Permit No. VA0087068 (City)
Attachment B: VPDES Permit No. VA0025160 (AlexRenew)
Attachment C: Summary of Alexandria Sewer System and Combined Sewer System Permit Activities (PowerPoint Presentation dated June 27, 2012)
Attachment D: Standard Operating Procedures (*High Flow Guidance*, *Overflow Monitoring at Four-Mile Run Pump Station*, and *Hoof Run Junction Chamber)*
Attachment E: High Flow Report (dated September 5-10, 2011)
Attachment F: Incident Record and Resolution Report for Four Mile Run Pump Station (incident start date September 8, 2011)
Attachment G: Corrective Action Notice for Four Mile Run Pump Station (dated September 13, 2011)
Attachment H: Work Orders #15555 and #15556
Attachment I: Work Order #17682
Attachment J: Work Order #13788
Attachment K: Amended and Restated Service Agreement (dated October 1, 1998)
Attachment L: Four Mile Run Pumping Station Existing Diagram

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EXECUTIVE SUMMARY

City of Alexandria & Alexandria Renew Enterprises
Compliance with Nine Minimum Controls for the Combined Sewer Collection and Conveyance System and Wastewater Treatment Plant

On June 26 and 27, 2012, an inspection team comprised of staff from U.S. Environmental Protection Agency (EPA) Region 3 and Office of Enforcement and Compliance Assurance (OECA), the State of Virginia Department of Environmental Quality (VADEQ), and EPA contractor PG Environmental, LLC (hereafter, collectively, EPA Inspection Team) inspected the City of Alexandria (hereafter, City) and Alexandria Renew Enterprises (hereafter AlexRenew) combined sewer collection and conveyance system and wastewater treatment plant in Alexandria, Virginia.

The City and AlexRenew provide wastewater conveyance and treatment services to a service population of about 350,000 people within the City of Alexandria as well as unincorporated portions of Fairfax County, Virginia prior to the discharge of effluent to specific waters in the Potomac River Basin. AlexRenew is responsible for the operation and maintenance of the AlexRenew Water Resource Recovery Facility (WRRF), pump stations, interceptors, and combined sewer overflow (CSO) regulators and tide gates. AlexRenew is also the responsible party for the management and implementation of the industrial pretreatment program (IPP). The City is responsible for the operation and maintenance of the collection system mains.

The primary purpose of the inspection was to evaluate the City's and AlexRenew's compliance with the Nine Minimum Controls (NMCs) for the combined sewer system (CSS) as described in EPA's 1994 National Combined Sewer Overflow (CSO) Control Policy and the EPA guidance document titled *Guidance for Nine Minimum Controls* (EPA 832-B-95-003), dated May 1995. As required by Part I, Section E of Virginia Pollutant Discharge Elimination System (VPDES) Permit No. VA0087068 (hereafter, Permit), the City must continue implementation of the NMCs as part of its long-term control plan (LTCP; approved by DEQ in February 1999) and maintain records to demonstrate compliance with the LTCP. A copy of the City Permit is included as Attachment A. AlexRenew's activities are regulated under VPDES Permit No. VA0025160 (administratively extended). A copy of the AlexRenew Permit is included as Attachment B.

The EPA Inspection Team held discussions with City and AlexRenew staff, conducted field verification activities in the collection system and at the WRRF, and obtained pertinent documentation regarding the City's and AlexRenew's implementation of the NMCs. A summary of field activities is included as Exhibit 1.

The EPA Inspection Team noted several observations. These observations are summarized in Table 1.

Table 1. Summary of NMCs and Observations

NMC	Observations
NMC # 1 – Proper operation and regular maintenance programs for the sewer system and CSO outfalls.	1. According to City staff, intrusion is often observed at the Royal Street Regulator for CSO 002 during weekly inspections. Observations such as time, intrusion flow rate, sewer capacity are not being recorded. 2. Based on a comparison of a wet weather event and the AlexRenew standard operating procedures (SOPs), system overflow conditions are not properly documented or inspected in accordance with the current SOPs. AlexRenew's SOPs state that the Four Mile Run Pump Station assets will overflow if the detention tank level reaches 13 feet. At numerous times on September 8 and 9, 2011, the detention tank overflowed at levels between 12.15 and 12.33 feet. 3. A review of the AlexRenew team's High Flow Report dated September 5–10, 2011 identified a number of "Event/Occurrence" entries on September 8, 2011 between 1820 and 2100* concerning flooding, sewer backups, and surcharging.
NMC # 2 – Maximum use of the collection system for storage.	1. The City and AlexRenew do not have a structured approach to evaluate the weir heights within the CSS to maximize storage of wastewater flows in the system. 2. The City and AlexRenew do not have any records or documentation stating the current status of additional storage available within the system. 3. City representatives stated that Fairfax County is not required to conduct inflow and infiltration (I/I) assessments or to reduce I/I, which reduces the potential for storage in the system. 4. The current position and structure of the Hooff's Run Junction Chamber makes this asset vulnerable to flooding and minimizes collection system storage capacity. This junction chamber has been documented to be submerged during wet weather events. The available documentation does not state how much stream water was flowing into the sewer system and reducing system storage capacity. 5. Intrusion into the conveyance system was observed at CSO 002 during the inspection. Intrusion reduces storage in the collection system.
NMC # 3 – Review and modification of pretreatment requirements to ensure CSO impacts are minimized.	1. The Royal St. Bus garage is up gradient of CSO 001; however, the facility has not been evaluated for or directed to make any changes specifically related to reducing or eliminating process water discharges during or after wet weather events to minimize impacts on CSO.
NMC # 4 – Maximization of flow to the publicly owned treatment works for treatment.	1. The Four Mile Run Pump Station had a pumping capacity of 11.4 million gallons per day (mgd); however, its associated force main had a maximum capacity of 9.4 mgd. The capacity of the force main limits maximization of flow to the treatment plant and places higher demand on the stations storage capacity. 2. Intrusion into the conveyance system was observed at CSO 002 during the inspection. Intrusion limits AlexRenew's ability to maximize the conveyance of flow to the WRRF for treatment. 3. Evaluations of wet weather events document a number of times when unpermitted discharges were made out of the Four Mile Run Pump Station while the pump station was pumping less than its design flow capacity. 4. The City does not maintain records to document that they conveyed all wet weather flows to the Publicly Owned Treatment Works (POTW) within the constraints of the CSS and the capacity of the POTW.
NMC # 5 – Elimination of CSOs during dry weather.	1. Dry weather overflows (DWOs) have occurred at CSOs in the conveyance system. The City reported the occurrence of six DWOs in 2009.

Table 1. Summary of NMCs and Observations

NMC	Observations
NMC # 8 – Public notification to ensure that the public receives adequate notification of CSO occurrences and CSO impacts.	1. The EPA Inspection Team observed two discharge locations without signage. One of the discharge locations was reported to be a CSO and the other was a constructed sanitary sewer overflow (SSO).

*NOTE: AlexRenew's records and documentation use a 24-hour clock notation. To maintain consistency, that same notation is used here.

ADDITIONAL OBSERVATIONS

1) An unpermitted CSO structure was observed at the Hooff's Run Junction Structure, which had the potential to discharge directly into Hooff's Run. Based on a review of the two sewer lines flowing into this junction structure, one sanitary sewer line and one currently defined as a combined sewer line, it appeared that this structure serves as both a CSO and as a constructed SSO.

2) A constructed SSO structure was observed at the Four Mile Run Pump Station. This structure has the potential to discharge into Four Mile Run from the pump station's service chambers and the wet weather storage tanks.

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I. INTRODUCTION

On June 26 and 27, 2012 a compliance inspection team comprised of staff from Environmental Protection Agency (EPA) Region 3 and Headquarters, Virginia Department of Environmental Quality (DEQ) and EPA contractor, PG Environmental, LLC, inspected the City of Alexandria (City) and Alexandria Renew Enterprises (hereafter AlexRenew, formerly the Alexandria Sanitation Authority) combined sewer collection system and wastewater treatment plant in Alexandria, Virginia. The purpose of the inspection was to evaluate the City's and AlexRenew's compliance with the Nine Minimum Controls (NMCs) for the combined sewer system (CSS) as described in EPA's 1994 National Combined Sewer Overflow (CSO) Control Policy and EPA's guidance document titled *Guidance for Nine Minimum Controls (EPA 832-B-95-003)*, dated May 1995. As required by Part I, Section E of VPDES Permit No. VA0087068 (hereafter, Permit), the City must continue implementation of the NMCs as part of its long-term control plan (LTCP; approved by DEQ in February 1999) and maintain records to demonstrate compliance with the LTCP.

The compliance inspection included the following major activities:

- Discussions with representatives from the City and AlexRenew regarding the operation of the sewer collection system, wastewater treatment plant, permitted CSOs, and the industrial pretreatment program (IPP).
- A physical inspection of AlexRenew Water Resource Recovery Facility (WRRF).
- A physical inspection of four CSOs and their associated control structures (see Exhibit I for a summary of field activities).
- Evaluation of AlexRenew's operational procedures for the WRRF and the interceptor/trunk sewer system during wet weather events.
- Verification of the City's and AlexRenew's adherence to the requirements for implementation of the NMCs as outlined in Virginia Pollutant Discharge Elimination System (VPDES) permit (VA0087068) issued January 17, 2007.

Section III of this report summarizes the observations and findings of the inspection. Section IV identifies additional findings noted during the inspection.

The following personnel were involved in the inspection:

City of Alexandria:	Lalit Sharma, Division Chief - Environmental Quality Yon Lambert, Deputy Director - Operations Emily Baker, City Engineer Jesse Maines, Senior Environmental Specialist Erin Bevis-Carver, Civil Engineer III Jeremy Hassan, Water Quality Compliance Specialist
Alexandria Renew Enterprises:	Jim Sizemore, Quality Manager Adrienne Fancher, Chief Operating Officer Rickie Everetie, Chief Plant Operator Ron Allen, Plant Superintendant Jeff Duval, Engineering Manager Joel Gregory, Process Manager Larry Cable, General Lead

City Consultant:	Clyde Wilber, Principal, Greeley and Hansen
Virginia Department of Environmental Quality:	Douglas Frasier, VPDES Permit Writer Sharon Allen, Water Compliance Inspector
EPA Representatives:	Steve Maslowski, EPA Region 3 Matthew Colip, EPA Region 3 James Zimny, Headquarters
EPA Contractor:	Danny O'Connell, PG Environmental, LLC Jake Albright, PG Environmental, LLC

II. BACKGROUND AND GENERAL DESCRIPTION OF RESPONSIBILITIES

The City of Alexandria and portions of Fairfax County discharge wastewater to the City's collection system and WRRF. About 5 percent of the City's sewer system is combined and about 95 percent is separate. The flows from Fairfax County account for approximately 55 percent of the total flow in the collection system on a daily basis (Fairfax County is permitted a maximum 60 percent share of the system). The City is approximately 15 square miles with a population of about 142,000. The population of the total service area, including the contributing municipalities, is about 350,000. Average daily flow to the WRRF is approximately 35 million gallons per day (mgd). The design flow of the WRRF is 54 mgd.

The City conducted a PowerPoint presentation (Attachment C) for the EPA Inspection Team on June 27, 2012. The presentation outlined the City's (and AlexRenew's) responsibilities for the collection system.

The City's Transportation and Environmental Services (T&ES) operates and maintains the collection system within the City except for the interceptor sewers which are owned and operated by AlexRenew. The City owns all four CSOs, but the CSOs are maintained by AlexRenew (i.e., tide gates and regulators for CSOs 001, 002, 003, and 004). AlexRenew also owns and operates the pump stations and wet weather storage vaults within the City, as well as a plant flow regulator near the CSO 002 control weir.

The Permit authorizes discharges from the WRRF and four CSO locations within the conveyance system. The CSOs are permitted to discharge to the Oronoco Bay, Hunting Creek Embayment, or Hooff's Run, which are all located in the Potomac River Basin. The Permits also include requirements and other conditions regarding the operation and maintenance of the WRRF, the industrial pretreatment program, and management and control of the CSOs. Table 2 summarizes AlexRenew's interceptor sewers.

Table 2. Summary of AlexRenew's Interceptor Sewers

Interceptor Name	Size Range (inches)	Approx. Length (miles)
Holmes Run	30-72	6.4
Commonwealth	27-72	3.2
Potomac	36-42	2.4
Potomac Yard	24-30	1.6

III. ASSESSMENT OF NINE MINIMUM CONTROLS IMPLEMENTATION

A. NMC #1 – Proper Operation and Regular Maintenance Programs for the Sewer System and the CSOs

Section E.1 of the Permit requires the permittee to "Conduct Proper Operations and Regular Maintenance Programs." Section E.1 states:

> *The permittee shall continue to implement the operation and maintenance plan for the Combined Sewer System (CSS) that includes the elements listed below. The permittee shall update the plan to incorporate any changes to the system and shall operate and maintain the system accordingly. The permittee shall maintain records to document the implementation of the plan.*

Section E.1 of the Permit further requires:

a. *Designation of a Manager for the CSS. The permittee shall designate a person to be responsible for the wastewater collection system and serve as the contact person regarding the CSS.*
b. *Inspection and Maintenance of CSS.*
    i. *The permittee shall ensure monthly inspection and maintenance of all outfalls, tide gates, diversion and regulator structures within the CSS.*
    ii. *The permittee shall inspect each CSS outfall twice a month to confirm that no dry weather overflows are occurring.*
    iii. *The permittee shall maintain records of inspections and maintenance for all aforementioned structures.*
c. *Provision for Trained Staff. The permittee shall continue to ensure the availability of trained staff to complete the operation, maintenance, repair and testing functions required to comply with the terms and conditions of this permit. Each staff member shall receive appropriate training and all training shall be documented and updated annually.*
d. *Allocation of funds for O&M. The permittee shall allocate adequate funds specifically for operation and maintenance activities. The permittee shall submit a certification of assurance with the annual report that the necessary funds, equipment and personnel have been committed to carry out the O&M plan for the next fiscal year.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The first minimum control, proper operation and regular maintenance of the CSS and CSO outfalls, should consist of a program that clearly establishes operation, maintenance, and inspection procedures to ensure that a CSS and treatment facility will function in a way to maximize treatment of combined sewage and still comply with NPDES permit limitations."

According to EPA's guidance document, a Proper Operation and Maintenance (O&M) Program generally should include the following:

- The organization and people responsible for various aspects of the O&M program.
- Resources (i.e., people and dollars) allocated to O&M activities.
- Planning and budgeting procedures for O&M of the CSS and treatment facilities.
- List of the facilities (e.g., tide gates, overflow weirs) critical to the performance of the CSS.

- Written procedures and schedules for routine, periodic maintenance of major items of equipment and CSO diversion facilities, as well as written procedures to ensure that regular maintenance is performed.
- A process for periodic inspections of the facilities listed previously.
- Written procedures, including procurement procedures if applicable, for responding to emergency situations.
- Policies and procedures for training O&M personnel.
- A process for the periodic review and revision of the O&M program.

The EPA Inspection Team made the following observations:

During the inspection of the Royal Street Regulator for CSO 002, the EPA Inspection Team observed intrusion from the Hunting Creek Embayment into the collection system. When questioned about whether this is common, City representatives responded that intrusion is often observed during weekly inspections of the regulator. However, these observations and field variables, including times, intrusion flow rate, sewer capacity, height of freeboard on weir wall, are not being documented or recorded. Refer to Exhibits 1 and 2 for a description and photograph (refer to Photograph 4) of the asset.

1) The AlexRenew team has developed a number of operational standard operating procedures (SOPs) to support normal and regularly experienced operational conditions. Attachment D contains copies of the SOPs reviewed for this component of the inspection process. The inspection team reviewed three SOPs, *High Flow Guidance*, *Overflow Monitoring at Four-Mile Run Pump Station*, and *Hoof Run Junction Chamber*.

   The SOPs contained requirements to capture the critical information needed to describe the operational procedure. The City did not consistently document operational variables such as inspection times, flows, or document comments that described the operational status of the sewer structures being observed.

   Specific examples were observed in the entries made on September 8, 2011 at 2010 for the Four Mile Run Pump Station (FMR) and the collection system. (NOTE: AlexRenew's records and documentation use a 24-hour clock notation. To maintain consistency, that same notation is used here.) These entries contain different plant flow rates for the same time. Another example is the entry made for September 9, 2011 at 2300, which, based on flow comparisons, appears to have the wrong date.

   In addition, the operations team does not inspect or document the wet well and/or overflow weir heights during periods of peak asset demand and stress (e.g. September 7 at 1600 and 2300; September 8 at 0300, 0923, and 2010) during the September 5 – 10, 2011 wet weather event. The SOP required monitoring every 20 minutes. In addition, a number of the log entries for the FMR pump station did not contain data sets for the station pump or flow rates (e.g. September 7 at 1600 and 2300; September 8 at 0300). Without regular observations of the overflow weirs and the station's pump rates, it was not possible to know if the station was discharging or if the City was maximizing flows to the WRRF or storage within the collection system.

AlexRenew generated an internal *Incident Record and Resolution Report* (Attachment F) that stated, "the Four Mile Run pump station overflowed on three separate occasions from 7:00 am on September 8 to 4:40 am on September 9, 2011." FMR data entries made on September 8, 2011 include:

- 0300: "detention tank level 9.16."
- 0705: "detention tank discharge flow was 14 inches over weir wall detention tank level 13.15."

There was a four-hour time lapse when no inspections or observations were conducted at the FMR overflow weirs leaving the actual overflow start time unknown.

The AlexRenew team conducted its own evaluation of this event. This activity was documented in the AlexRenew Corrective Action Notice (CAN) (see Attachment G). The CAN stated that SOPs were not followed. The AlexRenew team conducted a root-cause analysis of the September wet weather event as a component of the CAN process.

Two observations were made: the AlexRenew team 1) did not monitor overflows; and 2) did not document the operational observations of variables made during the inspection or monitoring activities. The CAN identified both short- and long-term actions to ensure future compliance. The long-term actions included the revision and update of SOPs, training on the updated SOPs, and the development of log sheets to record overflows.

The CAN did not review or discuss issues associated with the overflow heights observed during the event or the heights stated as "approximate" in the SOP. The approximate height stated for the detention tank to start overflowing is 13 feet. There are multiple data entries during the event that document the detention tank level at 12.15 feet, yet there is flow over the weir from the detention tank. Based on information contained in the event report, the EPA Inspection Team estimated that there are operational conditions and variables that create overflows of the detention tank at levels well below 13 feet.

2) A review of the AlexRenew team's *High Flow Report* dated September 5–10, 2011 identified a number of "Event/Occurrence" entries on September 8, 2011 between 1820 and 2100 concerning flooding, sewer backups, and surcharging. The inspection team found no associated work orders (WOs) for these "Event/Occurrence" entries in the data provided. Two WOs for September 9, 2011 (#15555 and #15556, Attachment H) were located.

   The City responded to the WOs 3 and 11 days, respectively, after the residents' calls concerning sewer backups. Both WOs documented that the sewer main was flowing at the time of the service inspection. WO #15556 stated that "signs of a surcharge in the manhole at the corner of Donelson Street and the service road" were found.

   In some instances, the City responded to sewer backups 3 and 11 days after being informed of an unpermitted discharge. Based on the information available, the EPA Inspection Team noted that sewage backups into residences were occurring within the City and not being reported to the state or the EPA.

A search of the WOs received by the inspection team did find a WO (#17682, Attachment I) for one of the addresses documented in the *High Flow Report,* 104 East Monroe Avenue. This WO was for another backup that occurred on December 9, 2011.

It took the City seven days to respond to the WO. The "City did install a backflow preventer in the manhole at the rear of the property" to stop the surcharge from the sewer main. There was no record of any illegal sewer discharges reported for this address.

On July 14, 2011, a WO (#13788, Attachment J) was created for "raw sewage" backup "through entire court yard area/parking lot." The WO states that the line was not inspected or serviced until March 27, 2012.

B. NMC #2 – Maximum use of the Collection System for Storage

Section E.2 of the Permit requires the permitee to "Maximize Use of the Collection System for Storage." Section E.2 of the Permit states:

> *The permittee shall maximize the in-line storage capacity of the CSS. The permittee shall maintain records to document implementation.*
>
> a. *Maintain all dams or diversion structures at or exceeding their current heights (as of effective date of permit).*
> b. *Minimize discharges from the CSS outfalls by maximizing the storage capacity provided by the dams and diversion structures; allowing for later treatment at the POTW.*
> c. *Keep maintenance records for the dams or diversion structures and activities dealing with sewer blockages.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "As the second minimum control, maximum use of the collection system for storage means making relatively simple modifications to the CSS to enable the system itself to store wet weather flows until downstream sewers and treatment facilities can handle them."

EPA's guidance document provides several examples of simple control measures that can be implemented to increase the storage capacity of a CSS. These measures include the following:

- Inspecting collection system to identify deficiencies which restrict storage capacity of the system (e.g., sediment build up in sewer lines, undersized pipe).
- Maintaining and repairing tide gates to eliminate leaking.
- Adjusting regulator settings to maximize weir heights for increased storage within the sewer system.
- Retarding inflows by using special gratings or hydrobrakes in catch basins to restrict rate at which surface runoff is permitted into the system.
- Using localized upstream detention for short-term storage (e.g., upstream parking area usage for temporary water storage).
- Upgrading or adjusting pump operations at interceptor lift stations to increase pump rates if downstream sections have available hydraulic capacity.
- Removing obstructions to flows (e.g., sediment accumulation or other debris).

EPA Inspection Team noted the following observations:

1) The City and AlexRenew did not have a structured approach to evaluate the weir heights within the CSS to maximize storage of wastewater flows in the system. City representatives indicated that CSOs 003 and 004 may have been evaluated within the past 20 years.

2) The City and AlexRenew did not have any records or documentation stating the current status of additional storage available within the system.

3) City representatives stated that Fairfax County was not required to conduct inflow and infiltration (I/I) assessments or to reduce I/I. Fairfax County owns a majority share in the WRRF capacity. Below is a description of the joint use agreement between the City and Fairfax County.

   The *Amended and Restated Service Agreement* (Agreement; Attachment K) became effective on October 1, 1998. The Agreement is a joint use service arrangement that gives Fairfax County a 60 percent (maximum) share in the capacity of the WRRF as well as share in two other joint use facilities, the Commonwealth Interceptor and the Holmes Run Trunk Sewer. Conversely, the City has a 40 percent share; it can use its entire share or lease to other municipalities if desired. City representatives stated that there are flow sensors on the interceptors where the Fairfax County system discharges into the City's system. Monitoring data is used for billing purposes in addition to capacity control.

   Table 3 below describes the joint use facilities and the share owned by Fairfax County as obtained from the Agreement.

Table 3. Fairfax County Share of Joint Use Facilities

Facility	Fairfax County Share (maximum possible)
AlexRenew WRRF	32.4 mgd maximum average monthly flow (60 percent of Permit authorized design flow (54.0 mgd)) 64.8 mgd maximum daily quantity
Commonwealth Interceptor	
Hooff's Run Junction Chamber to the connection for the County's Jones Point Pumpover	57.7 mgd
Jones Point Pumpover connection to the WRRF	64.8 mgd
Holmes Run Trunk Sewer	
From the City-County boundary to the original Cameron Station connection	18.9 mgd
From the original Cameron Station connection to MH 30 on the 1976 WAMATA relocation	42.7 mgd
From MH 30 on the 1976 WAMATA relocation to MH 17 on the 1976 WAMATA relocation	67.7 mgd

From MH 17 on the 1976 WAMATA relocation to Hooff's Run Junction Chamber	57.7 mgd

4) Hooff's Run Junction Chamber was documented as being submerged during wet weather events.

   According to AlexRenew's *High Flow Report* for September 5 – 10, 2011 (Attachment E), the Hooff's Run Junction Chamber was reported as being submerged on September 8, 2011 at 2000. The top of the structure was reported to be visible again at 2300 on September 8, 2011, and the middle of the structure was reported visible at 0100 on September 9, 2011. The available documentation does not state how much stream water was flowing into the sewer system and reducing system storage capacity.

5) Intrusion into the conveyance system was observed at CSO 002 during the inspection. Refer to Section III.A.1 of this report for additional details on the intrusion at this location.

C. NMC #3 – Review and Modification of Pretreatment Requirements to Ensure CSO Impacts are Minimized

Section E.3 of the Permit requires the "Control of Non-domestic Discharges." Section E.3 of the Permit states:

> *The permittee shall continue to implement selected CSO controls to minimize the impact of non-domestic discharges. The permittee shall coordinate with the Alexandria Sanitation Authority in the control of industrial users and whether additional modifications to its pretreatment program are necessary.*

Section E.3 continues by stating that control shall contain the following:

> *Control of non-domestic users shall also include the following:*
>
> a. *Maintain records documenting this evaluation and implementation of the selected CSO controls to minimize CSO impacts resulting from non-domestic discharges.*
> b. *Requiring Significant Industrial Users (SIU) discharging to the CSS to minimize batch discharges during wet weather conditions.*
> c. *Continued control of illicit dischargers and/or improper disposal to the CSS via detection and elimination.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "Under the third minimum control, the municipality should determine whether nondomestic sources are contributing to CSO impacts and, if so, investigate ways to control them. The objective of this control is to minimize the impacts of discharges into CSSs from nondomestic sources (i.e., industrial and commercial sources, such as restaurants and gas stations) during wet weather events, and to minimize CSO occurrences by modifying inspection, reporting, and oversight procedures within the approved pretreatment program."

EPA's guidance document provides the following steps for municipalities to implement the third NMC:

- Inventory nondomestic discharges to the CSS, including the identification of discharge locations on a map of the system.
- Assess the impact of nondomestic discharges on the CSOs and receiving waters.
- Assess the value and feasibility of modifications to the existing pretreatment program's approach of regulating nondomestic users to reduce the impact on CSO discharges.

EPA Inspection Team noted the following observations:

1) The Royal Street Bus garage is upgradient of CSO 001 and the Pendleton Street Regulator. The facility has not been directed to make any changes related to reducing or eliminating process water discharges during or after wet weather events. Based on the information available during the inspection it was unclear if the facility was located within the combined or the recently separated sewer area.

AlexRenew is responsible for the IPP; however, the City owns and operates the collection system and manages the stormwater program. If this facility is in a combined sewer area the IPP team should evaluate possible operational changes (e.g. storage of concentrated wastewaters) during wet weather events to minimize impact on the CSO system.

D. NMC #4 – Maximization of Flow to the Publicly Owned Treatment Works for Treatment

Section E.4 of the Permit requires the permittee to "Maximize Flow to POTW." Section E.4 of the Permit states:

> *The permittee shall convey, to the greatest extent practicable, all wet weather flows to the POTW within the constraints of the CSS and the capacity of the POTW. The POTW is owned, operated and maintained by Alexandria Sanitation Authority and is regulated under a separate VPDES permit (VAOO25160). The permittee shall maintain records to document these actions.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The fourth minimum control, maximizing flow to the POTW, entails simple modifications to the CSS and treatment plant to enable as much wet weather flow as possible to reach the treatment plant. The objective of this minimum control is to reduce the magnitude, frequency, and duration of CSOs that flow untreated into receiving waters."

EPA's guidance document provides the following measures for municipalities to implement the fourth NMC:

- Determine the capacity of the major interceptor(s) and pump station(s) and ensure that full capacity is available.
- Analyze records comparing flows processed at the WRRF during wet and dry weather to determine relationships between performance and flow.
- Compare current flows with the design capacity of the overall facility, as well as the capacity of individual process units to identify available excess capacity.
- Determine the ability of the facility to operate acceptably at incremental increases in wet weather flows and estimate impacts on compliance.
- Determine whether any inoperative or unused treatment facilities on the POTW site can be used to store or treat wet weather flows.

- Develop cost estimates for any planned physical modifications and any additional O&M costs at the treatment plant due to the increased wet weather flow.

EPA Inspection Team noted the following observations:

1) The Four Mile Run Pump Station had a pumping capacity of 11.4 mgd; however, its associated force main had a maximum capacity of 9.4 mgd, limiting the storage able to be provided by the collection system. The main, a 24-inch force main, conveys flow to the Commonwealth Interceptor.

   City and AlexRenew representatives stated that the Four Mile Run Pump Station is equipped with two service chambers adding approximately 1.05 million gallons of capacity to the pumping station. Upon a field inspection of these service chambers, the EPA Inspection Team found that these chambers had the potential to overflow and cause an SSO discharge into Four Mile Run during wet weather events. A more detailed explanation of these chambers can be found in Section IV.B of this report.

2) Intrusion into the conveyance system was observed at CSO 002 during the inspection.

   According to City representatives who perform routine inspections of the CSO 002 weir, intrusion is typically observed at the location, but it is not recorded in the observation log. The EPA Inspection Team recommended that the City and AlexRenew evaluate the impacts of the intrusion on the CSS and WRRF during dry and peak flows. Refer to Section III.A.1 of this report for additional details on the intrusion at this location.

3) The EPA Inspection Team evaluated AlexRenew's *High Flow Report* for September 5-10, 2011(Attachment E). The report documented a number of times when unpermitted discharges were occurring from the Four Mile Run Pump Station while the pump station was pumping less than its designed flow capacity.

   At 0705 on September 8, 2011, AlexRenew reported that the Four Mile Run detention tank was discharging 14 inches over the weir wall. The reported pump station flow at the time was 7.21 mgd. As discussed previously, the pump station's capacity is 11.4 mgd and the 24-inch force main's capacity is 9.4 mgd. The *High Flow Report* for this event indicates that the discharge lasted until approximately 1015. The Four Mile Run detention tank was also reported to be discharging at "2430" on September 9, 2011. (The correct time is believed to have been 12:30am on September 9, 2011.) The pump station had a flow of 6.94 mgd at this time. The detention tank was reported to still be discharging at 4:30am on September 9, 2011 (flow reported as 6.33 mgd). The Four Mile Run Pump Station and service chambers were reported to be unclogged at 8:30am on September 9, 2011. No further discharges were reported at this location during the September 5-10, 2011 wet weather event.

   A detailed flow schematic of the Four Mile Run Pump Station, service chambers, and detention tank can be found in Attachment L.

4) The City does not maintain records to document that they conveyed all wet weather flows to the Public Owned Treatment Works (POTW) within the constraints of the CSS and the capacity of the POTW.

E. NMC #5 – Elimination of CSOs during Dry Weather

Section E.5 of the Permit requires the permittee to "Prohibit Combined Sewer Overflows during Dry Weather." Section E.5 of the Permit states:

Dry weather overflows from CSS outfalls are prohibited. Dry weather flow conditions shall mean the flow in a combined sewer that results from sanitary sewage, industrial wastewater and infiltration/inflow; with no contribution from storm water runoff or storm water induced infiltration. Wet weather flow condition shall mean the flow in a combined sewer including storm water runoff and/or storm water induced infiltration. Documentation required during dry weather CSO events are as follows:

a. *All dry weather overflows must be reported to DEQ and the local health department within 24 hours of when the permittee becomes aware of a dry weather overflow.*
b. *Upon becoming aware of an overflow, the permittee shall begin corrective action immediately. The permittee shall monitor the dry weather overflow until the overflow has been eliminated.*
c. *The permittee shall record, in the inspection log book, an estimate of the beginning and ending times of the discharge, discharge volume and corrective measures taken.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

"The fifth minimum control, elimination of CSOs during dry weather, includes any measures taken to ensure that the CSS does not overflow during dry weather flow conditions. Since the NPDES program prohibits dry weather overflows (DWOs), the requirement for DWO elimination is enforceable independent of any programs for the control of CSOs."

EPA's guidance document states that "a visual inspection program of sufficient scope and frequency is needed to provide reasonable assurance that any occurrence will be detected." The document also provides several examples of actions to alleviate DWOs caused by operational issues. Examples of these corrective actions include adjustment of regulator settings, maintenance and repair of regulators, maintenance of tide gates, interceptor cleaning, and sewer repair.

EPA Inspection Team noted the following observations:

1) According to the City's PowerPoint presentation (Attachment C), dry weather overflows (DWOs) occurred at CSOs in the conveyance system. The City reported the occurrence of six DWOs in 2009. Table 4 below describes each event as reported by the City.

Table 4. Summary of Reported DWOs

Date	Location	Cause	Follow-up Action
5/10/09	CSO 003	Captured metering data	Increased inspection for a period. None observed.
7/17/09	CSO 003	Captured metering data	Increased inspection for a period. None observed.
8/19/09	CSO 004	During pump around for interceptor rehabilitation	Contractor instructed to lower level in manhole; discharge lasted about 15 minutes.
8/20/09	CSO 004	During pump around for interceptor rehabilitation	Pump around procedures modified and discharge stopped. Lasted about 20 minutes.
8/20/09	CSO 004	Siphon clogged	Crew cleaned the siphon and discharge lasted less than 2 hours.

Table 4. Summary of Reported DWOs			
Date	Location	Cause	Follow-up Action
8/28/09	CSO 004	During pump around for interceptor rehabilitation	Contractor directed to lower elevation in the wet well and discharge reduced, yet not stopped due to intense, sporadic rainfall. Not able to estimate duration of DWO.

F. NMC #6 – Control of Solid and Floatable Materials in CSOs

Section E.6 of the Permit requires "Control Solid and Floatable Materials." Section E.6 of the permit states:

The permittee shall implement measures to control solid and floatable materials in the CSS. Such measures shall include:

a. *Regular catch basin and street cleaning within the CSS sewershed.*
b. *Cleaning of the trunk lines and structures to prevent accumulation of solids.*
c. *Consideration of entrapment and baffling devices to reduce discharges of solids and floatable materials.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The sixth minimum control is intended to reduce, if not eliminate, visible floatables and solids using relatively simple measures. Simple devices including baffles, screens, and racks can be used to remove coarse solids and floatables from combined sewage, and devices such as booms and skimmer vessels can help remove floatables from the surface of the receiving water body."

EPA's guidance document provides schematics and a more thorough description of possible modifications and devices that can be used to control and remove solids and floatables from combined sewage.

G. NMC #7 – Pollution Prevention

Section E.7 of the Permit requires the permitee to "Develop and Implement Pollution Prevention Program." Section E.7 of the Permit states:

The permittee shall continue to implement the pollution prevention (P2) program to reduce the impact of CSOs on receiving waters. The permittee shall maintain records to document the pollution prevention implementation activities. Specific P2 measures include:

a. *Street sweeping and catch basin cleaning at an appropriate frequency to prevent large accumulations of pollutants and debris.*
b. *A public education program that informs the public of the City's household hazard waste recycling program.*
c. *A waste oil and antifreeze recycling/referral service program.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

"The seventh minimum control, pollution prevention, is intended to keep contaminants from entering the CSS and thus receiving waters via CSOs[...]The objective of this minimum control is to reduce to the greatest extent possible the amount of contaminants that enter the CSS."

EPA's guidance document provides information regarding measures such as street cleaning, public education, solid waste collection, product ban/substitution, hazardous waste collection, and recycling as actions which can be taken to prevent contaminants from entering the CSS.

H. NMC #8 – Public Notification to Ensure that the Public Receives Adequate Notification of CSO Occurrences and CSO Impacts

Section E.8of the Permit requires the permitee to provide "Public Notification." Section E.8 of the Permit states:

The permiittee shall continue to implement a public notification plan to inform citizens of when and where CSOs occur.

Section E.8 of the Permit further states that the process must include:

a. A notice to alert persons using all affected receiving water bodies. The permittee shall ensure that identification signs at all CSS outfalls are maintained and easily readable by the public.
b. The permittee shall maintain records documenting public notification.

As stated in EPA's *Guidance for Nine Minimum Controls:*

"The intent of the eighth minimum control, public notification, is to inform the public of the location of CSO outfalls, the actual occurrences of CSOs, the possible health and environmental effects of CSOs, and the recreational or commercial activities (e.g., swimming and shellfish harvesting) curtailed as a result of CSOs."

EPA's guidance document provides the following measures for notifying the public about CSO events:

- Posting at affected use areas.
- Posting at selected public places.
- Posting at CSO outfalls.
- Notices in newspapers or on radio and TV news programs.
- Letter notification to affected residents.
- Telephone hot line for interested citizen calls.

EPA Inspection Team noted the following observations:

1) The EPA Inspection Team observed two unpermitted overflow locations that also did not have signage. The unpermitted overflow locations were observed at Hooff's Run and Four Mile Run. City representatives stated that these locations did not have signage. Observations made by the EPA Inspection Team during visits to both locations on June 26, 2012 confirmed that signage informing the public of a discharge location was not present.

I. NMC #9 – Monitoring to Effectively Characterize CSO Impacts and the Efficacy of CSO Controls

Section E.9 of the Permit requires the permittee to conduct a "Long-Term Control Plan Review." Section E.9 of the Permit states:

> *The permittee shall review the Long-Term Control Plan (LTCP) annually for compliance with water quality standards, minimization of overflows and impacts from overflows. Any changes shall be submitted to the Department of Environmental Quality Northern Regional Office.*

As stated in EPA's *Guidance for Nine Minimum Controls:*

> "The ninth minimum control involves visual inspections and other simple methods to determine the occurrence and apparent impacts of CSOs. This minimum control is an initial characterization of the CSS to collect and document information on overflow occurrences and known water quality problems and incidents, such as beach or shellfish bed closures, that reflect use impairments caused by CSOs."

EPA's guidance document states that a municipality should characterize its system (obtain maps of CSS, locations of CSO outfalls, etc.), record the occurrence of overflows (via visual inspection, inspection aids, or automatic measurement), and record and summarize information on water quality or usage of the CSO receiving waters.

IV. ADDITIONAL FINDINGS

A. Hooff's Run Junction Chamber

The EPA Inspection Team conducted a site visit at the Hoooff's Run Junction Chamber on June 26, 2012. During an inspection of the structure, it was found that the chamber had the potential to discharge during a high flow event; however, the structure is not a permitted CSO under VPDES Permit No. VA0087068.

The structure is designed to receive flow from the Commonwealth Interceptor and the Holmes Run Trunk Sewer and direct it to the WRRF. The Commonwealth Interceptor is reported to be a combined sewer asset, while the Holmes Run Trunk Sewer is a sanitary sewer asset. The EPA Inspection Team found that the structure had engineered overflow gates near the top of the chamber which would allow an overflow directly into Hooff's Run during a significant high flow event. Photographs 2 and 3 illustrate the position of the overflow gates in the Hooff's Run Junction Chamber. City representatives stated that they were aware of the structure's potential to discharge into Hooff's Run. This junction chamber functions as both an unpermitted CSO and a constructed SSO. Refer to Exhibits 1 and 2 of this report for a description of and photographs from the site visit.

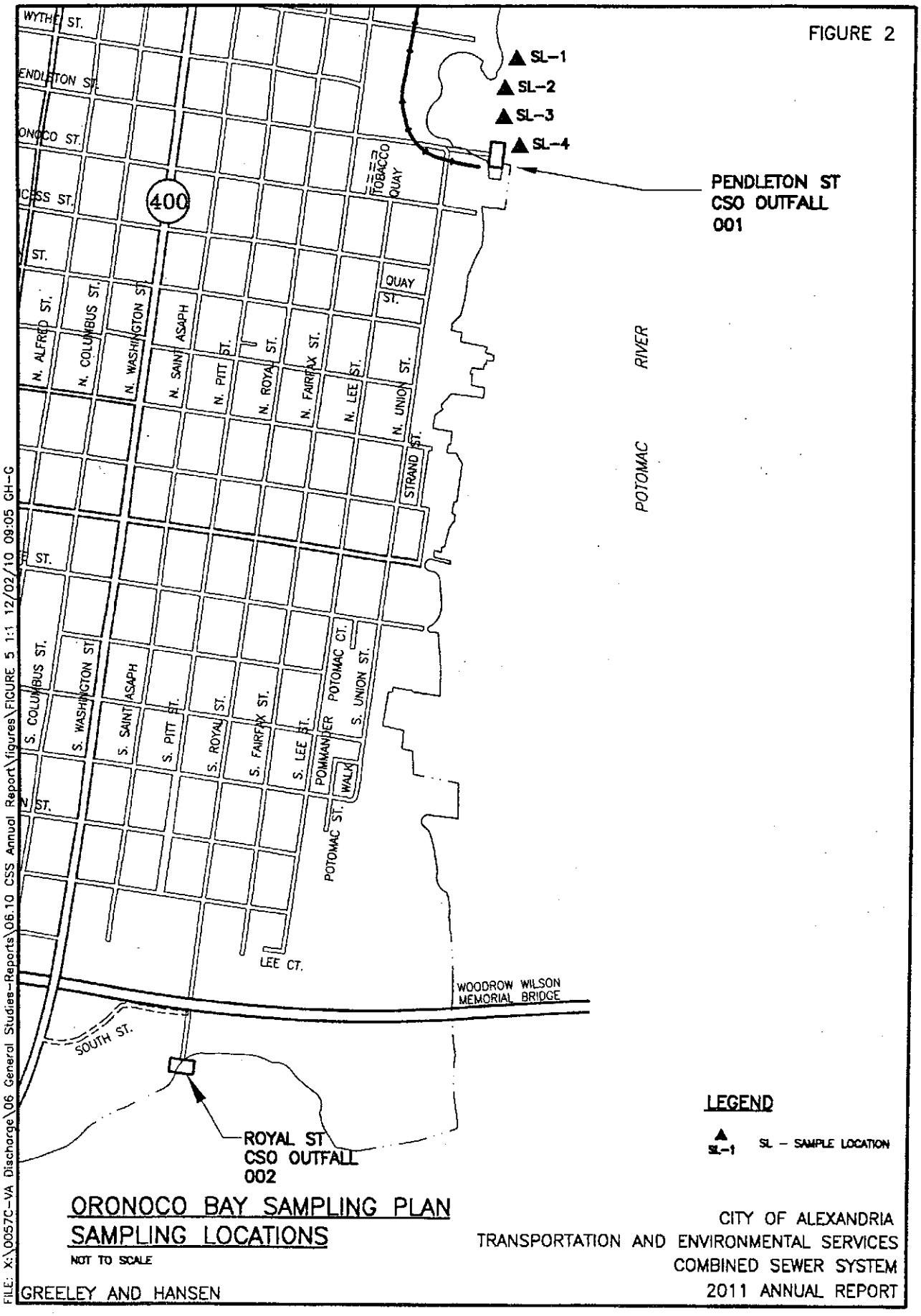
B. Four Mile Run Service Chambers

The EPA Inspection Team conducted a site visit at the Four Mile Run Pump Station and Service Chambers on June 26, 2012. During an inspection of the structures, the EPA Inspection Team found that the chambers had the potential to discharge during high flow events. The Four Mile Run Pump Station and Service Chambers are located on the north end of the Commonwealth Interceptor.

The chambers are designed to provide added storage capacity for the Four Mile Run Pump Station. As stated above, the pumping capacity for the station is 11.4 mgd while the capacity of the 24-inch force main is only 9.4 mgd. The service chambers are able to store an added 1.05 million gallons in a high flow event. If a high flow event exceeds the capacity of the force main and the storage chambers, sanitary sewer flow has the potential to overflow the service chamber into Four Mile Run. Refer to Section III.D.3

of this report for details on a past unpermitted discharge event. A schematic of the Four Mile Run Pump Station and Service Chambers can be found in Attachment L. Also, refer to Exhibits 1 and 2 of this report for a description of and photographs from the site visit.

FIGURE 2



ORONOCO BAY SAMPLING PLAN
SAMPLING LOCATIONS

NOT TO SCALE

GREELEY AND HANSEN

CITY OF ALEXANDRIA
TRANSPORTATION AND ENVIRONMENTAL SERVICES
COMBINED SEWER SYSTEM
2011 ANNUAL REPORT

FILE: X:\0057C-VA Discharge\06 General Studies-Reports\06.10 CSS Annual Report\figures\FIGURE 5 1:1 12/02/10 09:05 GH-G

Attachment 7

APPENDIX C: ORONOCO BAY SAMPLING RESULTS

Routine, Routine or CSO	Last CSO Event (days)	Sample ID Date (yymmdd)	SL SL1-SL4	Field Data Measurments Taken From Sampling Container Time	Temp (°C)	pH	DO - mg/L	Hardness mg/L CaCO3	Laboratory Data (container numbers listed below) #1 - MPN/100 mL Fecal C.	E. Coli	Total Coliform	#2 - mg/L CBODS	#3 - mg/L P or N TP	TKN	#4 - mg/L TSS	#5 - mg/L N NH_3-N	NO_2-N	#6 - mg/L N NO_3-N	#7 - µg/L Antimony	Cadmium	Cr III	Copper	Lead	Mercury	Nickel	Selenium	Silver	Zinc	#8 - µg/L Cr VI	#10 - mg/L Oil/Grease
Routine	>1	070912	SL1	9:30 AM	26.7	7.19	5	200	900	130	1600	< 3.0	0.063	1.2	14	< 0.10	0.81	0.043	11	< 0.50	3.4	2.8	< 2.0	< 0.20	< 4.0	5.5	< 1.0	< 20	< 5.0	< 5.0
Routine	>1	070912	SL2	9:52 AM	27.3	7.19	3.87	200	75	75	1600	< 3.0	0.061	0.9	9	< 0.10	0.73	0.044	< 5.0	< 0.50	3.3	2.7	< 2.0	< 0.20	< 4.0	< 5.0	< 1.0	< 20	5.3	< 5.0
Routine	>1	070912	SL3	10:05 AM	27.3	7.14	5.54	250	1600	350	> 1600	< 3.0	0.064	1.3	16	< 0.10	1	0.044	< 5.0	< 0.50	3.3	2.7	< 2.0	< 0.20	< 4.0	< 5.0	< 1.0	< 20	< 5.0	< 5.0
Routine	>1	070912	SL4	10:25 AM	27	7.3	5.65	200	900	280	900	< 3.0	0.062	1.1	12	< 0.10	< 0.050	< 0.043	< 5.0	1.2	3.8	2.8	< 2.0	< 0.20	< 4.0	< 5.0	< 1.0	< 20	2.1	< 5.0
Routine	>1	070917	SL1	8:47 AM	21.6	7.37	8.75	240	110	110	170	< 3.0	0.079	1.2	23	0.3	0.72	0.043	< 5.0	0.53	< 2.5	2.3	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	3	< 5.0
Routine	>1	070917	SL2	9:10 AM	22.1	7.09	8.57	200	130	130	300	< 3.0	0.077	1.1	22	0.38	0.72	0.044	< 5.0	< 0.50	< 2.5	2.2	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	2	< 5.0
Routine	>1	070917	SL3	9:15 AM	22.5	7.29	6.54	250	80	80	130	4.3	0.074	1.4	23	0.31	0.75	0.046	< 5.0	< 0.50	< 2.5	2	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	2.4	< 5.0
Routine	>1	070917	SL4	9:25 AM	22.6	7.45	8.55	250	240	240	300	< 3.0	0.25	1.4	17	0.29	0.78	0.045	< 5.0	< 0.50	< 2.5	2	< 2.0	< 0.20	9.1	< 5.0	< 1.0	< 20	31	< 5.0
Routine	>1	070918	SL1	8:54 AM	22.7	7.66	6.76	240	130	130	230	3.6	0.068	0.66	20	0.44	0.79	0.065	< 5.0	1.3	< 2.5	5.8	< 2.0	< 0.20	9.1	< 5.0	< 1.0	< 20	< 5	< 5.0
Routine	>1	070918	SL2	9:03 AM	22.3	7.6	8.86	240	230	230	230	5.4	0.061	0.98	13	0.25	0.72	0.06	< 5.0	< 0.50	< 2.5	3	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	< 5	< 5.0
Routine	>1	070919	SL3	9:16 AM	22.5	7.77	8.61	220	230	230	230	3.6	0.056	0.53	11	0.14	0.75	0.046	< 5.0	< 0.50	< 2.5	2.9	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	< 5	< 5.0
Routine	>1	070919	SL4	9:24 AM	22.3	7.58	8.62	240	300	300	300	< 3.0	0.057	0.61	10	0.3	0.76	0.051	< 5.0	< 0.50	< 2.5	4	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	< 5	< 5.0
Routine	>1	070924	SL1	8:25 AM	24.2	7.74	7.42	86	230	230	230	< 3.0	0.073	0.74	29	< 0.10	1.1	0.04	< 5.0	< 0.50	< 2.5	3.5	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	< 5	< 5.0
Routine	>1	070924	SL2	8:40 AM	24.1	7.74	7.27	95	220	220	220	< 3.0	0.078	0.36	25	< 0.10	1	0.041	< 5.0	< 0.50	< 2.5	3.3	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	< 5	< 5.0
Routine	>1	070924	SL3	8:50 AM	24	7.79	7.47	94	170	130	170	< 3.0	0.068	0.52	21	< 0.10	1	0.041	< 5.0	< 0.50	< 2.5	2.1	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	5.9	< 5.0
Routine	>1	070924	SL4	9:02 AM	23	7.62	6.77	100	230	230	300	< 3.0	0.045	0.85	11	< 0.10	0.97	0.047	< 5.0	< 0.50	< 2.5	2.3	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	5.9	< 5.0
Routine	>1	070926	SL1	8:14 AM	24.2	7.74	6.58	140	230	130	230	< 2.0	0.043	0.3	19	< 0.10	1.1	0.047	< 5.0	< 0.50	< 2.5	2.1	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	5.9	< 5.0
Routine	>1	070926	SL2	8:28 AM	24.4	7.78	6.73	140	270	270	800	< 3.0	0.041	0.12	14	< 0.10	1	0.044	< 5.0	< 0.50	< 2.5	2.2	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	070926	SL3	8:37 AM	24.3	7.79	6.87	140	300	300	300	< 3.0	0.06	0.43	14	< 0.10	1.2	0.047	< 5.0	< 0.50	< 2.5	2.2	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	5.3	< 5.0
Routine	>1	070926	SL4	8:49 AM	24.2	7.66	6.85	130	230	230	230	< 3.0	0.042	0.6	11	< 0.10	1.2	0.047	< 5.0	< 0.50	< 2.5	2.6	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071001	SL1	8:29 AM	23.1	7.81	6.98	140	500	500	500	< 2.0	0.086	1.9	42	< 0.10	1.1	0.043	< 5.0	< 0.50	< 2.5	2.4	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	5.8	< 5.0
Routine	>1	071001	SL2	8:48 AM	23	7.86	7.2	140	5,000	3,000	9,000	< 2.0	0.075	0.19	40	0.13	1.1	0.076	< 5.0	< 0.50	< 2.5	2.4	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	11	< 5.0
Routine	>1	071001	SL3	8:58 AM	23.2	7.78	7.32	140	500	500	500	< 2.0	0.073	< 0.10	27	< 0.10	1.1	0.043	< 5.0	< 0.50	< 2.5	2.5	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071001	SL4	9:29 AM	23.3	7.81	7.04	140	300	300	300	< 2.0	0.057	0.27	17	0.25	1.1	0.042	< 5.0	< 0.50	< 2.5	4.4	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071003	SL1	8:28 AM	24	7.6	6.94	150	2400	2400	2400	< 2.0	0.054	1.4	11	< 0.12	1.3	0.058	< 5.0	< 0.50	< 2.5	4.4	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071003	SL2	8:40 AM	23.9	7.76	6.89	140	1700	1700	1700	< 3.0	0.054	0.17	9.5	< 0.11	1.2	0.057	< 5.0	< 0.50	2.6	3.6	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	5.3	< 5.0
Routine	>1	071003	SL3	8:49 AM	23.7	7.87	6.93	140	2400	2400	2400	< 3.0	0.058	0.53	11	0.16	1.1	0.051	< 5.0	< 0.50	< 2.5	3.6	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071003	SL4	8:57 AM	23.7	7.9	6.79	130	500	500	500	< 3.0	0.064	3.3	16	< 0.12	1.1	0.055	< 5.0	< 0.50	< 2.5	4.8	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071008	SL1	8:57 AM	25.8	7.91	6.98	140	700	700	700	< 3.0	0.072	1.1	27	< 0.12	1.1	0.048	14	< 0.50	< 2.5	4.4	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071008	SL2	9:10 AM	25.7	7.73	6.84	140	500	500	500	< 3.0	0.065	1.2	12	< 0.12	1.1	0.046	< 5.0	< 0.50	< 2.5	4.1	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071008	SL3	9:17 AM	25.7	7.89	6.31	140	700	700	700	< 3.0	0.06	1.1	14	< 0.11	1.1	0.069	< 5.0	< 0.50	< 2.5	3.6	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071008	SL4	9:26 AM	25.1	7.84	5.81	140	300	300	500	< 3.0	0.05	1.2	11	< 0.11	1	0.049	< 5.0	< 0.50	< 2.5	3.6	< 2.0	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
CSO	1	071025	SL1-1	13:20	18.4	7.84	8.28	N/A	16,000	5,000	16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL1-2	15:25	18.1	7.57	8.08	N/A	>16,000	16,000	>16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL1-3	5:14	18.8	9.44	8.3	N/A	2200	2200	5000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL2-1	13:30	19.1	7.67	8.4	N/A	9000	9000	>16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL2-2	15:35	18.77	7.29	8	N/A	9000	3000	>16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL2-3	17:25	18.7	9.44	8.11	N/A	2200	1300	5000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL3-1	13:53	19.1	7.63	8.17	120	>16,000	>16,000	>16,000	4.8	0.13	1.2	86	<0.12	0.76	0.044	<5.0	<0.50	<2.5	2.7	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	071025	SL3-2	15:43	18.5	7.29	8.79	140	9000	5000	16,000	<3.0	0.07	0.67	35	<0.10	0.54	0.028	<5.0	<0.50	<2.5	2.4	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	071025	SL3-3	17:31	18.8	7.9	8.01	150	2,800	700	9,000	<3.0	0.066	<0.12	39	<0.10	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL4-1	14:11	17.6	7.58	8.25	N/A	>18,000	>16,000	>18,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL4-2	15:56	18.5	7.32	7.92	N/A	16,000	16,000	>16,000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	071025	SL4-3	17:41	18.8	7.68	8.01	N/A	1400	1400	5000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL1-1	7:12	7.9	MP	MP	N/A	800	800	800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL1-2	8:40	7.8	MP	MP	N/A	200	200	400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL1-3	10:10	7.6	MP	MP	N/A	400	400	400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL2-1	7:18	8.0	MP	MP	N/A	200	200	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL2-2	8:45	7.9	MP	MP	N/A	400	400	400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL2-3	10:13	7.5	MP	MP	N/A	400	400	400	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL3-1	7:21	7.8	MP	MP	130	800	800	800	<3.0	0.029	0.99	25	0.13	1.6	<0.012	<5.0	<0.50	<2.5	<2.0	<2.0	<0.20	<5.0	<5.0	<1.0	<0.020	<5.0	<5.0
CSO	1	080112	SL3-2	8:48	7.8	MP	MP	130	1300	1300	1300	<3.0	0.057	0.84	8.5	0.11	1.6	<0.012	<5.0	<0.50	<2.5	<2.0	<2.0	<0.20	<5.0	<5.0	<1.0	<0.020	<5.0	<5.0
CSO	1	080112	SL3-3	10:16	7.7	MP	MP	130	800	800	800	<3.0	0.051	1.1	14	0.18	1.6	<0.012	<5.0	<0.50	<2.5	<2.0	<2.0	<0.20	<5.0	<5.0	<1.0	<0.020	<5.0	<5.0
CSO	1	080112	SL4-1	7:26	7.8	MP	MP	N/A	200	200	200	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL4-2	8:55	7.8	MP	MP	N/A	200	200	800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
CSO	1	080112	SL4-3	10:25	7.7	MP	MP	N/A	800	800	800	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Key:
N/A = Not Analyzed; Bacteria parameters analyzed only per monitoring plan
MP = Measurement Problem; Probe Malfunction
1 CSO ongoing
CSO within 24 Hours
> No CSO within last 24 Hours

APPENDIX C: ORONOCO BAY SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID Date (yymmdd)	Sample ID SL SL1-SL4	Field Data: Measurements Taken From Sampling Container in Field Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C mg/L CaCO3	Laboratory Data (container numbers listed below) MPN/100 mL SM 9221E Fecal C.	SM 9222B E. Coli	SM 9221B Total Coliform	mg/L SM 5210B CBOD5	mg/L P or N EPA 365.1 TP	EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	EPA 353.2 NO_3-N	mg/L N EPA 353.2 NO_2-N	µg/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	µg/L SM 3500 CR D Cr VI	mg/L EPA 1664A O/G Grease
Routine	>1	042308	SL1	10:22 AM	18.6	6.08	MP	110	500	500	500	3.4	0.029	1.30	26.0	0.25	0.82	0.027	<5.0	<1.0	<10.0	2.6	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	042308	SL2	10:37 AM	18.1	5.75	MP	84	1,600	1,800	1,600	3.9	0.026	1.10	23.0	<0.10	0.62	0.062	<5.0	<1.0	<10.0	2.3	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	042308	SL3	10:45 AM	18.6	5.87	MP	95	900	300	1,600	3.6	0.030	1.30	26.0	<0.10	0.79	0.018	<5.0	2.6	<10.0	5.0	<5.0	<0.20	<4.0	<5.0	<0.20	11.0	<5.0	<5.0
Routine	>1	042308	SL4	10:54 AM	18.8	6.46	MP	94	500	240	1,600	3.6	0.030	1.20	<10.0	<0.10	0.80	0.027	<5.0	<1.0	<10.0	2.2	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	043008	SL1	10:31 AM	19.4	6.41	9.56	90	<20,000	<20,000	<20,000	5.5	<0.010	0.95	19.0	0.27	0.10	0.024	<5.0	<1.0	<10.0	3.6	<5.0	<0.20	<4.0	<5.0	<0.20	13.0	<5.0	<5.0
Routine	>1	043008	SL2	10:42 AM	22.7	7.10	8.71	88	20,000	20,000	20,000	<5.0	<0.010	0.87	23.0	0.11	0.16	0.025	<5.0	<1.0	<10.0	3.5	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	5.6	<5.0
Routine	>1	043008	SL3	10:52 AM	26.4	7.22	8.51	94	<20,000	<20,000	<20,000	<5.0	<0.010	0.56	27.0	0.26	0.26	0.024	<5.0	<1.0	<10.0	3.1	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	043008	SL4	11:04 AM	27.7	6.66	8.44	88	20,000	20,000	<20,000	<5.0	<0.010	0.81	16.0	<0.10	0.39	0.026	<5.0	<1.0	<10.0	2.9	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050508	SL1	10:22 AM	29.3	6.56	10.90	86	1,300	1,300	2,300	<3.0	0.047	0.46	20.0	0.14	1.20	0.016	<5.0	<1.0	<10.0	2.0	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050508	SL2	10:36 AM	27.0	7.03	10.33	76	200	200	800	<3.0	0.039	0.32	21.0	<0.10	1.10	0.017	<5.0	<1.0	<10.0	2.0	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050508	SL3	10:41 AM	29.6	6.55	11.63	84	200	200	800	<3.0	<0.010	0.37	11.0	<0.10	1.10	0.018	<5.0	<1.0	<10.0	1.9	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050508	SL4	10:50 AM	30.6	6.90	10.97	80	800	800	800	<3.0	<0.010	0.32	<10.0	<0.10	1.20	0.016	<5.0	<1.0	<10.0	1.9	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050708	SL1	10:20 AM	31.4	6.55	8.81	78	400	400	400	<3.0	0.034	0.66	9.0	0.26	1.10	0.016	<5.0	<1.0	<10.0	1.0	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050708	SL2	10:30 AM	32.2	6.85	8.81	86	<200	<200	<200	<3.0	0.039	0.50	5.5	0.18	1.20	0.016	<5.0	<1.0	<10.0	1.3	<5.0	<0.20	<4.0	<5.0	<0.20	5.3	<5.0	<5.0
Routine	>1	050708	SL3	10:40 AM	35.0	7.23	8.68	90	200	200	200	<3.0	0.063	0.63	12.0	<0.10	1.20	0.015	<5.0	<1.0	<10.0	<1.0	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	050708	SL4	10:52 AM	23.1	6.73	9.02	84	200	200	200	<3.0	0.042	0.62	<5.0	<0.10	1.20	0.014	<5.0	<1.0	<10.0	1.0	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051408	SL1	11:30 AM	19.2	6.77	10.60	70	24,000	8,000	24,000	4.4	0.097	1.00	62.0	0.24	<0.050	0.017	<5.0	<1.0	<10.0	2.2	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051408	SL2	11:46 AM	31.5	6.70	12.00	66	13,000	8,000	24,000	5.5	0.100	0.38	45.0	0.21	0.67	0.018	<5.0	<1.0	<10.0	2.1	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051408	SL3	12:03 PM	32.8	6.70	11.50	55	8,000	8,000	24,000	4.1	0.110	0.38	26.0	0.21	0.69	0.016	<5.0	<1.0	<10.0	2.2	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051408	SL4	12:18 PM	24.6	6.70	11.40	55	13,000	13,000	13,000	4.1	0.090	0.32	51.0	0.22	0.69	0.017	<5.0	<1.0	<10.0	2.1	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051908	SL1	11:47 AM	22.4	6.87	1.017	87	1,100	1,100	3,000	<3.0	0.031	0.50	17.0	<0.10	1.30	0.016	<5.0	<1.0	<10.0	1.8	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051908	SL2	12:02 PM	30.2	6.58	10.22	84	200	200	2,300	<3.0	0.032	0.47	18.0	0.24	1.30	0.014	<5.0	<1.0	<10.0	1.6	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051908	SL3	12:12 PM	26.1	6.46	9.70	70	1,300	1,300	5,000	<3.0	0.029	0.44	18.0	<0.10	1.30	0.014	<5.0	<1.0	<10.0	1.7	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	051908	SL4	12:22 PM	29.2	6.7	8.90	73	200	200	2,300	<3.0	0.028	0.46	17.0	0.36	1.20	0.015	<5.0	<1.0	<10.0	1.4	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	052208	SL1	10:33 AM	17.1	6.55	9.77	71	200	200	1,300	<3.0	0.014	0.52	15.0	<0.10	1.20	0.012	<5.0	<1.0	<10.0	1.5	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	052208	SL2	10:42 AM	18.8	6.67	8.65	70	200	200	2,300	<3.0	0.026	0.46	21.0	<0.10	1.20	0.012	<5.0	<1.0	<10.0	1.4	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	052208	SL3	10:52 AM	16.7	6.66	9.86	71	200	200	3,000	<3.0	0.015	0.49	9.0	<0.10	1.20	0.012	<5.0	<1.0	<10.0	1.4	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	052208	SL4	11:01 AM	15.7	6.52	9.37	74	200	200	2,300	<3.0	0.650	0.47	20.0	<0.10	1.20	<0.012	<5.0	<1.0	<10.0	1.2	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	052708	SL1	10:45 AM	19.8	7.66	14.74	82	400	400	1,300	<2.0	<0.010	0.50	11.0	0.56	1.20	<0.012	<5.0	<1.0	<10.0	1.1	<5.0	<0.20	<4.0	<5.0	0.20	<10.0	<5.0	<5.0
Routine	>1	052708	SL2	3:55 PM	19.5	6.69	14.20	80	400	400	2,300	<2.0	<0.010	0.49	7.0	0.42	1.20	<0.012	<5.0	<1.0	<10.0	<1.0	<5.0	<0.20	<4.0	<5.0	0.20	<10.0	<5.0	<5.0
Routine	>1	052708	SL3	11:10 AM	19.8	6.77	14.25	78	200	200	200	<2.0	0.220	0.41	8.2	0.45	1.20	0.012	<5.0	<1.0	<10.0	<1.0	<5.0	<0.20	<4.0	<5.0	0.20	<10.0	<5.0	<5.0
Routine	>1	052708	SL4	11:29 AM	21.0	6.74	12.75	80	400	400	400	<2.0	<0.010	0.43	8.3	0.50	1.10	0.013	<5.0	<1.0	<10.0	1.3	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
CSO event	1	042908	SL1-1	11:02 AM	18.8	6.54	9.04		<20,000	<20,000	20,000																			
CSO event	1	042908	SL1-2	12:36 PM	18.9	6.89	9.56		<20,000	<20,000	20,000																			
CSO event	1	042908	SL1-3	2:12 PM	19.4	6.52	MP		<20,000	<20,000	<20,000																			
CSO event	1	042908	SL2-1	11:17 AM	18.8	6.47	8.79		<20,000	<20,000	20,000																			
CSO event	1	042908	SL2-2	12:50 PM	18.1	6.46	10.65		<20,000	<20,000	20,000																			
CSO event	1	042908	SL2-3	2:17 PM	19.0	6.31	MP		<20,000	<20,000	20,000																			
CSO event	1	042908	SL3-1	11:26 AM	18.6	6.18	8.54	92	<20,000	<20,000	40,000	5.1	<0.010	1.20	35.0	1.60	0.51	0.026	<5.0	<1.0	<10.0	7.2	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
CSO event	1	042908	SL3-2	12:57 PM	17.9	7.2	MP	66	<20,000	<20,000	<20,000	5.1	<0.010	0.74	20.0	0.25	0.16	0.021	<5.0	<1.0	<10.0	4.2	<5.0	<0.20	<4.0	<5.0	<0.20	0.013	<5.0	<5.0
CSO event	1	042908	SL3-3	2:22 PM	18.4	6.34	MP	66	<20,000	<20,000	3,000,000	3.3	<0.010	0.80	16.0	0.12	0.27	0.023	<5.0	<1.0	<10.0	3.6	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
CSO event	1	042908	SL4-1	11:36 AM	18.2	6.5	8.63		<20,000	<20,000	20,000																			
CSO event	1	042908	SL4-2	1:20 PM	18.4	6.94	MP		<20,000	<20,000	20,000																			
CSO event	1	042908	SL4-3	2:27 PM	19.0	6.35	MP		<20,000	<20,000	20,000																			
CSO event	1	052008	SL1-1	11:00 AM	17.1	7.25	12.75		300	240	300																			
CSO event	1	052008	SL1-2	12:30 PM	17.7	6.65	10.38		240	240	240																			
CSO event	1	052008	SL1-3	2:00 PM	16.9	6.54	11.67		240	240	240																			
CSO event	1	052008	SL2-1	11:09 AM	16.9	6.67	12.67		240	240	240																			
CSO event	1	052008	SL2-2	12:35 PM	17.5	7.00	10.80		900	500	500																			
CSO event	1	052008	SL2-3	2:05 PM	16.8	6.25	11.42		300	240	240																			
CSO event	1	052008	SL3-1	11:16 AM	16.9	6.78	12.07	70	900	900	900	<3.0	0.079	0.47	21	<0.10	1.10	0.015	<5.0	<1.0	<10.0	3.3	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
CSO event	1	052008	SL3-2	12:42 PM	17.6	6.68	11.65	74	500	500	500	<3.0	0.033	0.46	26	<0.10	1.10	0.015	<5.0	<1.0	<10.0	2.1	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
CSO event	1	052008	SL3-3	2:10 PM	16.9	6.29	11.14	80	500	500	>1,500	<3.0	0.120	0.50	22	<0.10	1.20	0.015	<5.0	<1.0	<10.0	1.8	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
CSO event	1	052008	SL4-1	11:25 AM	17.6	6.51	12.20		>1,600	>1,600	>1,500																			
CSO event	1	052008	SL4-2	12:51 PM	17.8	6.68	11.60		>1,600	>1,600	>1,500																			
CSO event	1	052008	SL4-3	2:18 PM	16.7	6.08	11.20		>1,600	300	500																			

Note:

Sampling/analytical testing conducted by Microbac Laboratories, Inc.

SL= Sample Location -Refer To Figure 4.

MP = Measurement Problem; DO Probe Malfunction - DO Probe either recalibrated in field and/or DO membrane replaced following sampling

1= CSO within 24 Hours

>1 = No CSO within last 24 Hours

CSO event samples collected within 24 hours of activation

APPENDIX D: ORONOCO BAY SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID Date (mmddyy)	Sample ID SL (SL1-SL4)	Field Data Measurements Taken From Sampling Container in Field Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C mg/L CaCO3	Laboratory Data (container numbers listed below) MPN/100 mL SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221D Total Coliforms	mg/L SM 5210B CBOD5	mg/L P or N EPA 365.1 TP	EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	EPA 353.2 NO_3-N	mg/L N EPA 353.2 NO_2-N	µg/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	µg/L SM 3500 CR D Cr VI	mg/L EPA 1664A Oil/Grease
CSO	1	042109	SL-1-1	10:21 AM	16.6	6.51	6.29		800	500	9,000																			
CSO	1	042109	SL-1-2	11:45 AM	17.9	6.50	6.97		1,300	1,100	>=16,000																			
CSO	1	042109	SL-1-3	1:15 PM	18.6	6.75	6.22		1,700	500	9,000																			
CSO	1	042109	SL2-1	10:28 AM	16.9	6.76	7.04		1,400	3,000	>=16,000																			
CSO	1	042109	SL2-2	11:50 AM	18.7	6.46	6.73		1,100	3,000	16,000																			
CSO	1	042109	SL2-3	1:21 PM	17.9	6.87	7.22		800	2,200	>=16,000																			
CSO	1	042109	SL-3-1	10:29 AM	17.0	6.80	6.90	90	2,300	1,700	16,000	<1	0.08	0.7	25	0.4	0.79	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
CSO	1	042109	SL-3-2	11:55 AM	17.5	6.46	7.41	84	1,300	800	5,000	<1	0.10	0.8	22	0.3	0.81	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
CSO	1	042109	SL-3-3	1:26 PM	18.1	6.70	7.11	94	1,700	2,200	14,000	<1	0.09	0.8	21	<0.2	0.83	<0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
CSO	1	042109	SL4-1	10:43 AM	16.9	6.65	7.44		700	210	16,000																			
CSO	1	042109	SL4-2	12:04 AM	18.1	6.45	6.84		1,700	700	16,000																			
CSO	1	042109	SL4-3	1:36 PM	18.5	6.62	7.24		8,000	800	3,500																			
Routine	>1	042309	SL1	8:52 AM	14.3	6.73	10.05	92	800	3,000*	1,700*	<1	0.10	1.0	35	0.2	0.81	<0.02	<5	<0.5	<2	2	<2	<0.5	6	<5	<0.2	<10	<10	<5*
Routine	>1	042309	SL2	9:07 AM	14.8	6.44	9.36	94	170	220*	280*	<1	0.12	1.5	42	0.3	0.51	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	042309	SL3	9:15 AM	14.6	6.58	9.72	92	170	220*	1,800*	<1	0.11	1.1	41	0.5	0.52	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	042309	SL4	9:24 AM	13.2	6.34	9.79	98	280	170*	500*	<1	0.11	1.8	38	<0.2	0.54	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	042709	SL1	8:56 AM	17.7	6.67	9.31	88	30*	17*	50*	<1	0.09	0.9	10	0.4	0.73	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	042709	SL2	9:05 AM	17.5	6.75	9.00	84	30*	21*	50*	<1	0.07	1.1	9	0.2	0.76	<0.02	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	042709	SL3	9:13 AM	17.8	6.76	8.35	80	23*	21*	35*	<1	0.06	1.7	17	0.3	0.75	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	042709	SL4	9:22 AM	17.5	6.68	9.16	84	23*	30*	23*	<1	0.06	0.9	7	0.3	0.76	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	043009	SL-1	8:50 AM	19.2	7.02	7.80	84	110	30	22	<1	0.08	1.0	21	0.3	0.82	<0.02	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	043009	SL-2	9:00 AM	19.2	6.67	7.78	96	23	11	22	<1	0.08	0.9	16	0.3	0.75	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	043009	SL-3	9:10 AM	19.0	6.88	8.01	80	30	17	17	<1	0.08	1.5	17	<0.2	0.75	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	043009	SL-4	9:20 AM	19.4	6.95	7.98	96	170	80	170	<1	0.07	0.7	14	<0.2	0.82	<0.02	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	050809	SL-1	8:56 AM	16.7	6.82	10.91	100	500*	500*	>=16,000*	<1	0.13	1.0	15	0.6	0.77	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	10	<10	<5*
Routine	>1	050809	SL-2	9:06 AM	16.9	6.79	10.72	96	230*	1,100*	16,000*	<1	0.11	<0.5	10	0.2	0.90	<0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	<5*
Routine	>1	050809	SL-3	9:14 AM	17.1	6.85	10.74	100	800*	1,400*	>=16,000*	<1	0.08	1.0	9	<0.2	0.84	<0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	050809	SL-4	9:26 AM	17.1	6.87	10.76	110	300	340	>=16,000*	<1	0.07	0.8	8	0.3	0.79	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	10	<10	<5*
Routine	>1	050709	SL-1	9:36 AM	16.9	6.47	9.80	120	2,400	>=24000	4,800	<1	0.31	1.3	65	0.4	0.74	0.03	<5	<0.5	<2	2	<2	<0.5	3	<5	<0.2	<10	<10	<5*
Routine	>1	050709	SL-2	9:35 AM	16.9	6.46	9.44	72	11,000	>=24000	930	<1	0.29	1.8	61	0.8	0.63	0.03	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5*
Routine	>1	050709	SL-3	9:45 AM	16.9	6.49	9.37	68	4,800	>=24000	11,000	<1	0.40	1.6	110	0.7	0.12	0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	050709	SL-4	9:55 AM	17.1	6.56	9.30	80	4,600	>=24000	4,600	3	0.23	1.3	89	<0.2	0.69	0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	051109	SL-1	9:32 AM	17.7	6.65	9.06	86	93	93	4,600	<1	0.10	1.3	10	<0.2	0.96	<0.02	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	051109	SL-2	9:42 AM	17.7	6.70	10.05	120	93	93	4,600	<1	0.07	1.0	11	0.3	0.98	<0.02	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	051109	SL-3	9:50 AM	17.7	6.47	9.38	130	43	93	4,600	<1	0.07	0.7	12	<0.2	0.96	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	5.4
Routine	>1	051109	SL-4	9:57 AM	17.5	6.60	9.04	84	93	93	11,000	<1	0.08	1.3	14	0.2	0.96	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
Routine	>1	051409	SL-1	9:35 AM	18.1	6.45	8.72	86	43	93	210	<1	0.07	1.3	13	<0.2	1.10	0.03	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	30	<10	6
Routine	>1	051409	SL-2	9:45 AM	18.1	7.32	8.91	100	23	21	230	<1	0.08	1.0	12	<0.2	1.10	0.03	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	6
Routine	>1	051409	SL-3	9:50 AM	18.1	7.06	8.77	96	23	23	4,600	<1	0.08	1.0	12	<0.2	1.10	0.02	<5	<0.5	<2	<1	<2	<0.5	2	<5	<0.2	<10	<10	7
Routine	>1	051409	SL-4	10:00 AM	18.2	7.47	8.87	88	43	43	600	<1	0.06	1.3	12	<0.2	1.10	0.02	<5	<0.5	<2	<1	<2	<0.5	2	<5	<0.2	<10	<10	7
Routine	>1	052109	SL-1	8:57 AM	22.1	6.56	8.23	120	23	15	23	<1	0.08	1.3	17	0.4	1.20	0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	8
Routine	>1	052109	SL-2	9:05 AM	22.1	6.86	8.06	110	43	39	240	<1	0.08	1.0	20	0.5	1.20	0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	6
Routine	>1	052109	SL-3	9:17 AM	22.1	6.60	7.40	120	23	9	150	<1	0.09	1.0	16	0.4	1.30	0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	8
Routine	>1	052109	SL-4	9:24 AM	21.7	7.05	8.44	120	23	43	240	<1	0.09	1.3	8	0.4	1.10	0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5*
CSO	1	061909	SL-1-1	8:30 AM	24.0	8.37	5.86		11,000	4,800	>=24,000																			
CSO	1	061909	SL-1-2	9:50 AM	24.8	6.58	6.45		4,600	2,400	>=24,000																			
CSO	1	061909	SL-1-3	11:00 AM	24.9	6.04	6.31		11,000	4,600	11,000																			
CSO	1	061909	SL-2-1	8:38 AM	24.0	6.07	6.30		4,800	2,400	>=24,000																			
CSO	1	061909	SL-2-2	9:54 AM	24.9	5.80	6.20		4,800	4,800	>=24,000																			
CSO	1	061909	SL-2-3	11:08 AM	24.5	5.97	5.99		11,000	>=24,000	>=24,000																			
CSO	1	061909	SL-3-1	8:45 AM	24.2	5.83	6.32	95	930	2,400	>=24,000	<5	0.09	1.0	21	0.4	0.96	<0.02	<5	<0.5	<2	2	<2	<0.5	3	<5	<0.2	20	<10	<5
CSO	1	061909	SL-3-2	9:58 AM	24.8	6.32	8.40	86	2,400	4,600	>=24,000	<5	0.13	1.3	36	<0.2	0.91	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	6
CSO	1	061909	SL-3-3	11:12 AM	25.0	8.15	8.00	90	>=24,000	4,600	>=24,000	<5	0.11	0.7	27	0.2	0.93	<0.02	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	30	<10	11
CSO	1	061909	SL-4-1	8:56 AM	23.7	5.80	6.18		4,600	1,300	>=24,000																			
CSO	1	061909	SL-4-2	10:10 AM	24.4	6.25	5.63		11,000*	2,400*	>=24,000*																			
CSO	1	061909	SL-4-3	11:21 AM	25.1	5.89	5.36		2,400	2,400	>=24,000																			
Routine	>1	080409	SL-1	9:22 AM					43*	43*	>=24,000*																			5*
Routine	>1	080409	SL-2	9:26 AM					43*	93*	2,100*																			45*
Routine	>1	080409	SL-3	9:29 AM					93*	75*	>=24,000*																			8*
Routine	>1	080409	SL-4	9:31 AM					150*	93*	2,400*																			5*
Routine	>1	080809	SL-1	8:12 AM					43*	120*	460*																			5*
Routine	>1	080809	SL-2	8:15 AM					210*	93*	>=24,000*																			7*
Routine	>1	080809	SL-3	8:18 AM					75*	93*	11,000*																			45*
Routine	>1	080809	SL-4	8:21 AM					120*	930*	4,800*																			8*
Routine	>1	081009	SL-1	8:35 AM					150*	4,300*	11,000*																			8*
Routine	>1	081009	SL-2	8:40 AM					23*	23*	4,800*																			5*
Routine	>1	081009	SL-3	8:43 AM					93*	120*	>=2,400*																			5*
Routine	>1	081009	SL-4	8:46 AM					43*	150*	4,600*																			5*
CSO	1	111409	SL-3-1	9:30 AM																										45*
CSO	1	111409	SL-3-2	10:30 AM																										45*
CSO	1	111409	SL-3-3	11:30 AM																										45*

Note:
Sampling event/field testing conducted by World Laboratories, Inc.
SL= Sample Location (Refer To Figure 4.
1= CSO within 24 Hours
>1 = No CSO within last 24 Hours
CSO event samples collected within 24 hours of CSO activation
* = Holding time has been exceeded, additional follow up samples were collected.
1 = Follow-up sample

APPENDIX C: ORONDOCO BAY SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID Date	Sample ID SL	Field Data Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C	Laboratory Data (container numbers listed below) MPN/100 mL SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221B Total Coliforms	mg/L SM 5210B CBOD5	mg/L P or N EPA 365.1 TP	EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	EPA 353.2 NO_3-N	mg/L N EPA 353.2 NO_2-N	SM 4500NO3-H NO_3+NO_2-N	ug/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	ug/L SM 3500 CR D Cr VI	mg/L EPA 1664A Oil/Grease
Routine	>1	041210	SL-1-1	10:19 AM	18.3	8.01	13.91	150	23	23	930	<6	0.06	0.8	10	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<6
Routine	>1	041210	SL-2-1	10:35 AM	18.2	8.08	13.88	130	150	150	930	<5	0.05	0.8	2	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041210	SL-3-1	10:45 AM	18.3	8.10	14.51	140	93	21	430	<5	0.07	1.2	20	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041210	SL-4-1	10:59 AM	18.3	8.19	14.79	130	93	93	2100	<5	0.08	0.7	18	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041510	SL-1-1	10:25 AM	17.7	8.24	10.98	200	21	21	75	<5	0.05	0.9	10	<0.2	0.70	<0.02	0.7	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041510	SL-2-1	10:35 AM	17.6	8.47	10.78	180	15	43	430	<5	0.05	0.8	10	<0.2	0.74	<0.02	0.74	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041510	SL-3-1	10:45 AM	17.6	8.39	10.78	180	75	39	75	<5	0.05	0.9	10	<0.2	0.82	<0.02	0.82	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041510	SL-4-1	10:56 AM	17.9	8.42	10.45	170	2400	2400	2400	<6	0.05	0.8	10	<0.2	0.73	<0.02	0.73	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	8
Routine	>1	041910	SL-1-1	9:58 AM	16.8	8.35	9.84	200	43	230	43	2	0.05	1.0	9	<0.2	1.0	<0.02	1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041910	SL-2-1	10:05 AM	16.7	8.26	9.61	160	930	930	930	<1	0.04	0.7	7	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	30	<10	<5
Routine	>1	041910	SL-3-1	10:15 AM	16.9	8.31	9.73	140	75	11	930	<1	0.05	0.7	6	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	041910	SL-4-1	10:27 AM	16.9	8.40	9.85	150	43	43	930	<1	0.03	0.8	7	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042210	SL-1-1	10:20 AM	16.4	8.57	10.02	170	210	930	2400	<1	0.09	0.8	9	<0.2	1.8	<0.02	1.8	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042210	SL-2-1	10:30 AM	16.2	7.53	8.20	180	11	290	2400	<1	0.06	<0.5	10	<0.2	1.7	<0.02	1.7	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	30	<10	<5
Routine	>1	042210	SL-3-1	10:40 AM	16.4	7.56	9.81	160	36	75	1600	<1	0.09	0.8	8	<0.2	1.2	<0.02	1.2	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042210	SL-4-1	10:55 AM	16.6	7.56	8.31	190	9	25	930	<1	0.04	0.8	6	<0.2	1.2	<0.02	1.2	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042810	SL-1-1	10:00 AM	18.1	8.18	8.21	170	43	43	430	<1	0.05	0.7	13	<0.2	1.2	<0.02	1.2	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042810	SL-2-1	10:07 AM	18.1	7.56	8.39	150	43	43	750	<1	0.04	0.8	14	<0.2	1.3	<0.02	1.3	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042810	SL-3-1	10:15 AM	18.1	7.50	8.21	140	70	70	1600	<1	0.06	1.0	13	<0.2	1.2	<0.02	1.2	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	18.7	<10	<5
Routine	>1	042810	SL-4-1	10:22 AM	18.0	7.52	8.84	150	210	210	2100	<1	0.05	0.8	14	<0.2	1.2	<0.02	1.2	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042910	SL-1-1	10:10 AM	18.0	7.83	10.42	390	150	150	430	2	0.03	0.6	8	<0.2	0.87	<0.02	0.87	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042910	SL-2-1	10:20 AM	18.0	7.53	10.26	330	75	75	2400	2	0.03	<0.5	4	<0.2	0.87	<0.02	0.87	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042910	SL-3-1	10:30 AM	18.8	7.52	10.16	330	430	430	930	2	0.03	0.7	10	<0.2	0.90	<0.02	0.9	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	042910	SL-4-1	10:40 AM	18.8	7.17	10.22	350	930	930	2400	2	0.03	0.9	8	<0.2	0.89	<0.02	0.89	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	050810	SL-1-1	9:42 AM	23.1	7.38	8.98	300	210	930	2400	2	0.07	1.1	16	<0.2	0.98	<0.02	0.98	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>1	050810	SL-2-1	9:55 AM	23.4	7.70	10.06	280	23	43	2400	1	0.04	0.8	11	<0.2	1	<0.02	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>1	050810	SL-3-1	10:02 AM	23.4	7.78	9.09	290	430	430	2400	2	0.04	1.1	10	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>1	050810	SL-4-1	10:10 AM	23.4	7.82	8.91	290	150	150	4600	2	0.05	0.7	12	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>1	051310	SL-1-1	10:35 AM	18.9	7.33	12.17	260	75	75	930	2	0.08	1.2	30	<0.2	0.62	<0.02	0.62	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	10	<10	<5
Routine	>1	051010	SL-2-1	10:45 AM	18.6	7.02	11.11	180	430	430	430	2	0.07	1.6	25	<0.2	0.63	<0.02	0.63	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>1	051010	SL-3-1	10:55 AM	18.2	7.19	11.35	170	75	75	930	2	0.08	1.1	22	<0.2	0.65	<0.02	0.65	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	10	<10	<5
Routine	>1	051010	SL-4-1	11:11 AM	18.6	7.43	11.84	160	23	23	2400	<1	0.09	1.1	28	<0.2	0.72	<0.02	0.72	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	10	<10	<5
CSO	<1	051210	SL-1-1	9:20 AM	18.4	6.78	13.20		80*	93*	230*																				
CSO	<1	051210	SL-2-1	9:25 AM	18.4	7.16	13.36		43*	43*	4600*																				
CSO	<1	051210	SL-3-1	9:30 AM	18.3	7.36	13.58	310	43*	43*	9907	3	0.04	1.7	11	<0.2	0.64	<0.02	0.64	<6	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
CSO	<1	051210	SL-4-1	9:40 AM	18.7	7.36	12.86		23*	23*	930*																				
CSO	<1	051210	SL-1-2	10:25 AM	18.8	7.49	13.85		21*	21*	2400*																				
CSO	<1	051210	SL-2-2	10:35 AM	18.7	7.45	13.01		25*	23*	2400*																				
CSO	<1	051210	SL-3-2	10:40 AM	18.7	7.25	13.72	260	43*	43*	2400*	4	0.02	1.6	10	<0.2	0.62	<0.02	0.62	<6	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
CSO	<1	051210	SL-4-2	10:50 AM	19.0	7.22	13.99		230*	230*	1500*																				
CSO	<1	051210	SL-1-3	11:35 AM	19.7	7.49	12.15		43	43	430																				
CSO	<1	051210	SL-2-3	11:45 AM	19.8	7.07	13.04		200	200	4600																				
CSO	<1	051210	SL-3-3	11:51 AM	19.3	7.31	14.16	230	210	210	2400	2	0.06	1.5	10	<0.2	0.62	<0.02	0.62	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
CSO	<1	051210	SL-4-3	12:00 PM	19.8	7.66	13.35		430	430	43																				
CSO	<1	073010	SL-1-1	9:50 AM	29.4	8.15	5.8		210	210	2400																				
CSO	<1	073010	SL-2-1	9:55 AM	30	8.25	5.26		24	24	11000																				
CSO	<1	073010	SL-3-1	10:00 AM	29.7	8.13	6.09	160	930	930	2400	<1	0.11	1	29	<0.2	0.12	<0.02	0.12	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	10	<10	<5
CSO	<1	073010	SL-4-1	10:18 AM	29.5	8.65	6.9		28	150	150																				
CSO	<1	073010	SL-1-2	11:15 AM	29.7	8.9	5.53		210	210	2400																				
CSO	<1	073010	SL-2-2	11:20 AM	30.1	8.52	5.15		93	93	150																				
CSO	<1	073010	SL-3-2	11:25 AM	29.8	8.3	6.17	160	230	230	230	<1	0.09	1	12	<0.2	0.14	<0.02	0.14	<6	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5
CSO	<1	073010	SL-4-2	11:30 AM	29.8	8.09	6.12		430	430	4600																				
CSO	<1	073010	SL-1-3	12:15 PM	30.3	8.2	6.31		2400	2400	11000																				
CSO	<1	073010	SL-2-3	12:20 PM	29.9	8.27	8.33		210	210	1500																				
CSO	<1	073010	SL-3-3	12:28 PM	30.1	8.1	8.61	110	210	210	4600	<1	0.09	0.7	16	<0.2	0.13	<0.02	0.13	<5	<0.5	<2	2	<2	<0.5	2	<5	<0.2	20	<10	<5
CSO	<1	073010	SL-4-3	12:30 PM	30.3	8.9	8.29		210	210	430																				
CSO	<1	080810	SL-1-1	11:00 AM	-	-	-		2400*	2400*	11000*																				
CSO	<1	080810	SL-2-1	11:02 AM	-	-	-		11000*	11000*	>=24000																				
CSO	<1	080810	SL-3-1	11:04 AM	-	-	-		430*	430*	4600*																				
CSO	<1	080810	SL-4-1	11:06 AM	-	-	-		4600*	4600*	4600*																				
CSO	<1	080810	SL-1-2	11:50 AM	-	-	-		4600*	4600*	4600*																				
CSO	<1	080810	SL-2-2	11:52 AM	-	-	-		930*	930*	4600*																				
CSO	<1	080810	SL-3-2	11:54 AM	-	-	-		2400*	2400*	2400*																				
CSO	<1	080810	SL-4-2	11:58 AM	-	-	-		4600*	4600*	11000*																				
CSO	<1	080810	SL-1-3	12:20 PM	-	-	-		930*	930*	2400																				
CSO	<1	080810	SL-2-3	12:22 PM	-	-	-		930*	930*	930*																				
CSO	<1	080810	SL-3-3	12:24 PM	-	-	-		2400*	2400*	2400*																				
CSO	<1	080810	SL-4-3	12:26 PM	-	-	-		750*	430*	11000*																				

Note:

Sampling analytical testing conducted by Marlet Laboratories, Inc.

SL= Sample Location -Refer To Figure 4

1= CSO within 24 Hours

>1 = No CSO within last 24 Hours

CSO event samples collected within 24 hours of CSO activities

* = Holding time has been exceeded, additional follow up samples were collected.

* = Preliminary sample

APPENDIX B: CRONOCO BAY SAMPLING RESULTS

Routine or CSO event	Last CSO Event	Sample ID Date (mmddyy)	Sample ID SL (SL1-SL4)	Field Data: Measurements Taken From Sampling Container in Field Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C mg/L CaCO3	Laboratory Data (container numbers listed below) MPN/100 mL SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221B Total Coliform	mg/L SM 5210B CBOD5	mg/L EPA 365.1 TP	mg/L P or N EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	mg/L N EPA 353.2 NO_2-N	mg/L N EPA 353.2 NO_3-N	mg/L N SM 4500NO3-H NO_3-NO_2-N	µg/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	µg/L SM 3500 CR D Cr VI	mg/L EPA 1664A Oil/Grease
Routine	>24 hrs	063011	SL-1-1	9:40 AM	25.9	5.66	6.46	150	17	14	500	2	0.1	1.1	14	<0.2	0.97	0.03	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	063011	SL-2-1	9:50 AM	25.9	6.96	6.51	150	22	17	800	2	0.11	0.8	12	0.3	0.97	0.03	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	5
Routine	>24 hrs	063011	SL-3-1	10:00 AM	27.0	6.75	6.58	150	40	<2	800	1	0.15	1.1	10	<0.2	0.98	0.02	1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	063011	SL-4-1	10:05 AM	27.0	6.75	6.36	150	80	<2	500	1	0.12	0.8	13	<0.2	0.99	0.02	1	<5	<0.5	<2	<1	<2	<0.5	<2	<5	<0.2	<10	<2	<5
Routine	>24 hrs	070711	SL-1-1	9:40 AM	25.6	5.78	6.23	120	240	240	300	<1	0.16	1.7	13	0.2	1.10	0.03	1.1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	070711	SL-2-1	9:50 AM	25.7	5.88	6.54	130	30	23	900	3	0.15	1.6	11	0.4	1.2	0.03	1.2	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	070711	SL-3-1	10:05 AM	28.8	5.93	6.75	130	80	50	2200	3	0.20	1.3	19	0.4	1.1	0.03	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	070711	SL-4-1	10:20 AM	28.8	5.96	6.34	120	30	23	300	2	0.03	1.1	19	<0.2	1.1	0.03	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	071111	SL-1-1	10:10 AM	30.1	7.35	7.63	170	90	90	280	3	0.18	1.6	16	0.4	0.8	0.02	0.79	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	10	<10	<5
Routine	>24 hrs	071111	SL-2-1	10:23 AM	30.1	7.48	7.48	89	50	50	1600	3	0.2	1.2	16	0.5	0.84	0.02	0.86	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	30	<2	<5
Routine	>24 hrs	071111	SL-3-1	10:37 AM	30.0	7.61	7.78	179	23	23	300	3	14	1.2	14	0.5	0.87	0.02	0.89	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>24 hrs	071111	SL-4-1	10:48 AM	30.1	7.69	7.50	89	130	50	1600	<1	0.23	1.2	15	0.3	0.79	0.02	0.81	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	<5
CSO	<24 hrs	071411	SL-1-1	9:46 AM	28.7	6.75	6.66		930	430	4300																				
CSO	<24 hrs	071411	SL-2-1	9:55 AM	28.6	7.21	6.78		930	430	4300																				
CSO	<24 hrs	071411	SL-3-1	10:05 AM	28.9	6.89	6.20	120	930	430	4300	<5	0.29	1.6	20	0.4	0.79	<0.02	0.79	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	<5
CSO	<24 hrs	071411	SL-4-1	10:15 AM	27.4	7.03	6.98		930	930	24000																				
CSO	<24 hrs	071411	SL-1-2	11:12 AM	29.3	MP	7.14		760	760	4300																				
CSO	<24 hrs	071411	SL-2-2	11:19 AM	28.9	MP	7.35		2300	930	7500																				
CSO	<24 hrs	071411	SL-3-2	11:24 AM	29.2	6.42	7.44	110	430	430	46000	<5	0.32	1.3	25	0.3	0.81	<0.02	0.81	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5
CSO	<24 hrs	071411	SL-4-2	11:33 AM	29.3	MP	7.38		2300	930	24000																				
CSO	<24 hrs	071411	SL-1-3	12:25 PM	28.9	6.71	6.62		930	930	46000																				
CSO	<24 hrs	071411	SL-2-3	12:30 PM	28.8	6.72	6.69		430	430	2200																				
CSO	<24 hrs	071411	SL-3-3	12:34 PM	29.1	6.68	7.08	110	430	230	2100	<5	0.15	1.3	25	0.4	0.8	<0.02	0.8	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5
CSO	<24 hrs	071411	SL-4-3	12:40 PM	29.2	6.78	7.06		230	230	4300																				
Routine	>24 hrs	071811	SL-1-1	9:35 AM	28.2	6.58	7.21	170	170	17	500	<1	0.17	1.2	16	<0.2	0.68	0.18	0.86	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	071811	SL-2-1	9:48 AM	28.1	6.58	7.18	92	25	22	220	<1	0.17	1	17	0.3	0.82	0.03	0.85	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	071811	SL-3-1	10:00 AM	28.3	7.90	7.36	100	50	50	280	<1	0.14	0.9	21	<0.2	0.97	0.03	1	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	071811	SL-4-1	10:11 AM	28.5	5.48	7.65	130	80	50	700	<1	0.1	0.8	17	<0.2	0.62		0.65	<5	1.1	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072111	SL-1-1	8:33 AM	30.6	7.53	6.68	130	30	30	1100	3	0.1	1.8	20	0.4	0.29	0.03	0.32	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	6
Routine	>24 hrs	072111	SL-2-1	8:45 AM	30.6	7.35	6.45	130	260	170	1100	3	0.11	0.7	19	0.3	0.07	0.02	0.09	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072111	SL-3-1	8:56 AM	30.8	7.44	6.80	130	140	13	800	3	0.1	1.3	18	0.3	0.16	0.02	0.18	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072111	SL-4-1	9:05 AM	30.7	7.98	7.07	130	80	80	2400	3	0.09	1.3	21	<0.2	0.43	0.02	0.45	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072511	SL-1-1	8:11 AM	32.6	7.21	6.85	140	21	17	140	2	0.12	1.7	15	<0.2	0.53	0.03	0.56	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072511	SL-2-1	9:24 AM	32.9	7.21	6.32	140	80	80	210	2	0.16	1.1	17	<0.2	0.6	0.02	0.62	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072511	SL-3-1	9:33 AM	32.8	8.05	6.34	140	80	80	130	3	0.14	1.0	20	<0.2	0.65	0.02	0.67	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072511	SL-4-1	9:45 AM	32.8	7.90	6.60	130	300	300	500	3	0.15	1	19	0.3	0.69	0.02	0.71	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072811	SL-1-1	9:10 AM	31.6	7.66	MP	130	80	27	500	3	0.12	1.4	18	0.3	0.69	0.03	0.72	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072811	SL-2-1	9:22 AM	31.4	7.65	7.64	140	17	7	220	<1	0.13	0.8	20	<0.2	1.1	<0.02	1.1	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	<5
Routine	>24 hrs	072811	SL-3-1	9:33 AM	31.4	7.1	MP	160	70	70	300	<1	0.11	1.1	23	0.3	0.65	<0.02	0.65	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072811	SL-4-1	9:44 AM	31.4	7.23	6.62	120	170	170	300	2	0.12	0.8	19	<0.2	0.62	0.02	0.64	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	080111	SL-1-1	9:45 AM	31.8	6.89	7.22	150	70	70	300	8	0.12	1.6	14	<0.2	1.1	0.03	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	080111	SL-2-1	9:56 AM	31.8	7.25	7.69	140	40	40	400	<5	0.13	1.1	14	<0.2	1.1	0.02	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	080111	SL-3-1	10:06 AM	31.6	7.44	7.24	140	80	22	800	2	0.16	1.1	14	<0.2	1.1	0.02	1.1	<5	>0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	080111	SL-4-1	10:26 AM	31.8	7.14	7.40	140	30	30	110	<5	0.14	1.1	15	0.3	1.1	0.02	1.1	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
CSO	<24 hrs	081511	SL-1-1	8:58 AM	27.2	7.02	6.00		300	130	1300																				
CSO	<24 hrs	081511	SL-2-1	9:05 AM	27.2	6.58	7.54		500	300	1300																				
CSO	<24 hrs	081511	SL-3-1	9:10 AM	27.3	7.34	6.90	140	500	110	1700	<1	0.15	0.8	19	<0.2	0.15	<0.02	0.15	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
CSO	<24 hrs	081511	SL-4-1	9:33 AM	27.3	6.82	7.76		230	80	1700																				
CSO	<24 hrs	081511	SL-1-2	11:02 AM	27.8	6.82	7.86		170	110	1100																				
CSO	<24 hrs	081511	SL-2-2	11:07 AM	27.9	6.87	8.12		170	170	2400																				
CSO	<24 hrs	081511	SL-3-2	11:13 AM	27.9	6.86	8.45	150	220	140	2400	3	0.15	0.8	20	0.3	0.8	<0.02	0.8	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	10	<10	<5
CSO	<24 hrs	081511	SL-4-2	11:20 AM	27.9	7.1	8.41		300	170	900																				
CSO	<24 hrs	081511	SL-1-3	12:01 PM	27.8	6.82	8.70		230	230	1300																				
CSO	<24 hrs	081511	SL-2-3	12:04 PM	27.7	6.92	8.89		300	170	1700																				
CSO	<24 hrs	081511	SL-3-3	12:07 PM	27.7	7.17	8.87	130	130	130	1300	3	0.13	0.8	25	0.3	0.07	<0.02	0.07	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	10	<10	<5
CSO	<24 hrs	081511	SL-4-3	12:13 PM	27.9	6.84	8.73		1300	800	8000																				

Note:

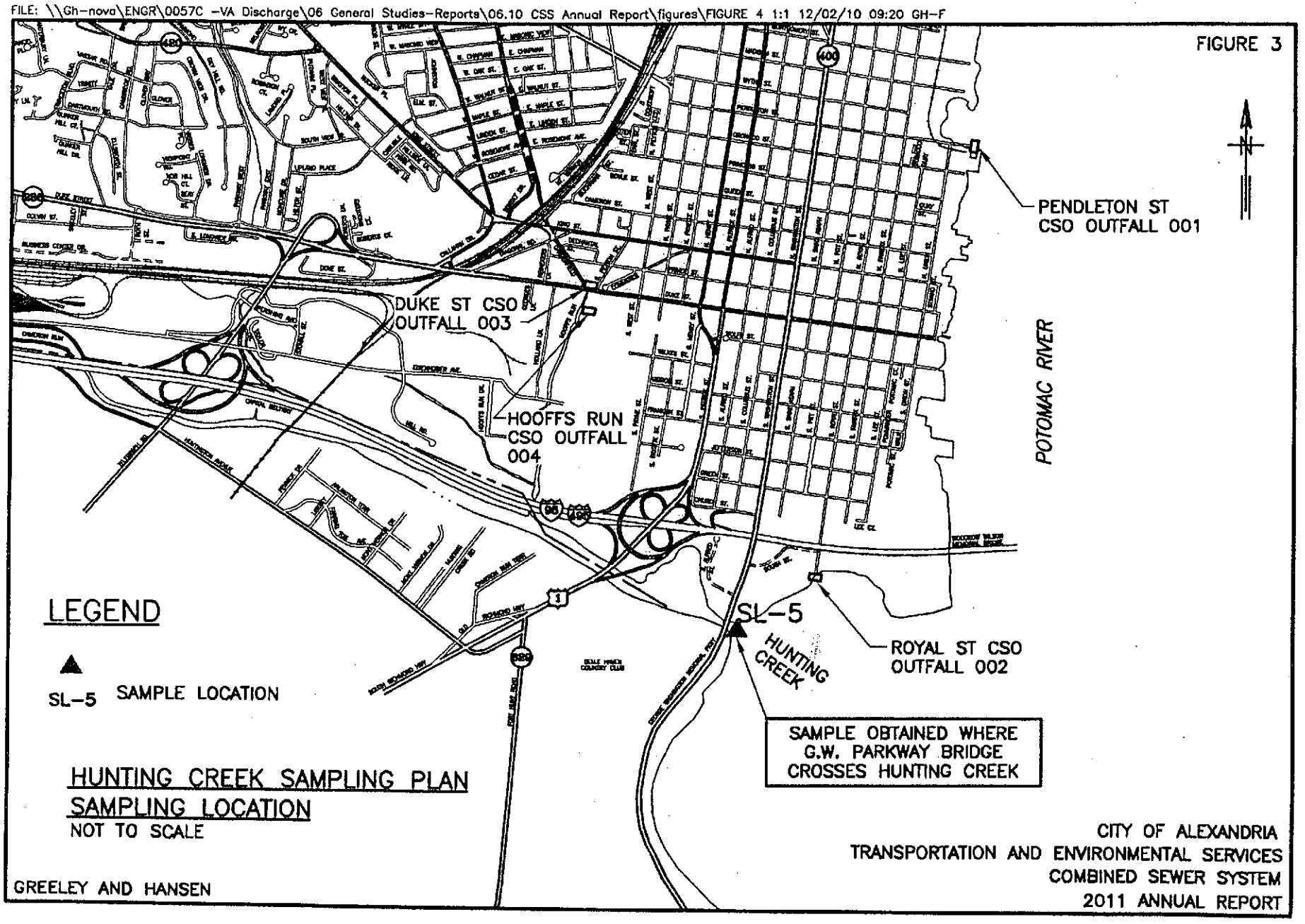
Sampling and lab analysis analysis conducted by Maxtel Laboratories, Inc.

SL= Sample Location -Refer To Figure 2.

<24 hrs = CSO within 24 Hours

>24 hrs = No CSO within last 24 Hours

CSO event samples collected within 24 hours of CSO activation



Attachment 8

APPENDIX B: HUNTING CREEK SAMPLING RESULTS

Routine, Routine or CSO	Last CSO Event (days)	Sample ID Date (yymmdd)	Sample ID SL	Field Data Measurments Taken From Sampling Container Time	Temp (°C)	pH	DO - mg/L	Hardness mg/L CaCO3	Laboratory Data MPN/100 mL Fecal C.	E. Coli	Total Coliform	mg/L CBOD5	mg/L P or N TP	TKN	mg/L TSS	mg/L N NH_3-N	NO_2-N	NO_3-N	Antimony	Cadmium	Cr III	Copper	µg/L Lead	Mercury	Nickel	Selenium	Silver	Zinc	µg/L Cr VI	mg/L Oil/Grease
Routine	>1	070912	SL5	11:30	25.5	7.95	5.26	180	900	500	1,600	5.7	0.038	1.6	9.5	<0.10	0	0.04	<5.0	1.4	3.6	5	<2.0	<0.20	4.4	<5.0	<1.0	25	< 5	5
Routine	>1	070919	SL5	9:56	22.3	7.34	7.20	280	340	340	2,400	3.6	0.043	0.5	17	0.12	0.88	0.014	<5.0	<0.50	<2.5	2.5	<2.0	<0.20	<5.0	<5.0	<1.0	<20	5.3	<5.0
Routine	>1	070926	SL5	9:29	23.5	7.57	6.10	120	16,000	16,000	16,000	<3.0	0.04	0.36	10	<0.10	2.3	0.044	<5.0	< 0.50	< 2.5	4.9	< 2.9	< 0.20	< 5.0	< 5.0	< 1.0	< 20	<5.0	< 5.0
Routine	>1	071003	SL5	10:00	24.1	7.48	6.88	140	1,700	1,700	5,000	<3.0	0.033	2.4	11	<0.10	4.9	0.036	< 5.0	< 0.50	< 2.5	3.1	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	071025	SL5-1	14:45	17.2	7.10	9.03	65	16,000	3,000	16,000	<3.0	0.063	1.9	11	<0.10	1.3	0.029	<5.0	<0.50	<2.5	3.2	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	071025	SL5-2	16:45	16.8	4.72	8.95	75	16,000	3,000	16,000	<3.0	0.063	<0.13	34	<0.10	1.1	0.047	<5.0	<0.50	<2.5	2.8	<2.0	<0.20	<5.0	<5.0	<1.0	28	<5.0	<5.0
CSO	1	071025	SL5-3	18:10	15.8	7.2	MP	75	9,000	2,800	>16,000	<3.0	0.063	<0.13	34	<0.10	1.1	0.047	<5.0	<0.50	<2.5	3.7	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	080112	SL5-1	7:48	10.3	MP	MP	87	13,000	13,000	13,000	<3.0	0.055	0.95	18	0.15	2.1	0.025	<5.0	<0.50	<2.5	3.2	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	080112	SL5-2	9:06	9.5	MP	MP	110	17,000	17,000	17,000	<3.0	0.041	1.3	26	0.4	2.4	0.03	<5.0	<0.50	<2.5	3.2	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0
CSO	1	080112	SL5-3	10:40	9.3	MP	MP	120	7,900	7,000	7,000	<3.0	0.59	1.6	23	0.31	2.9	0.031	<5.0	<0.50	2.6	3.1	<2.0	<0.20	<5.0	<5.0	<1.0	<20	<5.0	<5.0

Note:
N/A = Not Analyzed
MP = Measurement Problem
0 = CSO ongoing

Attachment 9

APPENDIX B : HUNTING CREEK SAMPLING RESULTS

		Sample ID		Field Data				Hardness	Laboratory Data																										
		Date	SL	Measurments Taken From Sampling Container in the Field					MPN/100 mL			mg/L	mg/L P or N		mg/L	mg/L N		mg/L N	µg/L														µg/L	mg/L
Routine or CSO event	Last CSO Event (days)	(yymmdd)	SL5	Time	Temp (°C)	pH	DO - mg/L	SM 2340 C mg/L CaCO3	SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221B Total Coliform	SM 5210B CBOD5	EPA 365.1 TP	EPA 351.2 TKN	SM 2540D TSS	SM 4500NH3-G NH_3-N	EPA 353.2 NO_2-N	EPA 353.2 NO_3-N	EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	SM 3500 CR D Cr VI	EPA 1664A Oil/Grease
Routine	>1	042308	SL5	11:40 AM	21.4	6.38	MP	80	1,600	1,600	1,600	3.3	<0.010	1.30	15.0	<0.10	1.60	0.027	<5.0	<1.0	<10.0	2.4	<5.0	<0.20	<4.0	<5.0	0.2	<10.0	<5.0	<5.0
Routine	>1	043008	SL5	11:39 AM	20.1	6.62	8.70	72	<20,000	<20,000	<20,000	<5.0	<0.010	0.92	<10.0	<0.10	0.79	0.018	<5.0	<1.0	<10.0	3.6	<5.0	<0.20	<4.0	<5.0	<0.20	19.0	<5.0	<5.0
Routine	>1	050708	SL5	11:17 AM	30.8	6.70	7.55	61	800	800	800	<3.0	0.028	0.76	<5.0	<0.10	1.30	0.020	<5.0	<1.0	<10.0	2.1	<5.0	<0.20	<4.0	<5.0	<0.20	11.0	<5.0	<5.0
Routine	>1	051408	SL5	1:00 PM	31.1	6.69	10.0	90	8,000	8,000	8,000	4.4	0.048	0.32	11.0	0.14	1.20	0.014	<5.0	<1.0	<10.0	2.8	<5.0	<0.20	<4.0	<5.0	<0.20	<10.0	<5.0	<5.0
Routine	>1	052708	SL5	12:15 PM	24.3	6.62	15.2	74	2,200	1,700	2,200	<2.0	<0.010	0.81	6.5	0.84	1.20	0.013	<5.0	<1.0	<10.0	2.8	<5.0	<0.20	<4.0	<5.0	0.2	11.0	<5.0	<5.0
CSO event	1	042908	SL6-1	12:00 PM	17.8	6.35	9.47	83	<20,000	<20,000	20,000	3.9	<0.010	0.87	<10.0	0.10	0.04	0.024	<5.0	<1.0	<10.0	5.8	<5.0	<0.20	<4.0	<5.0	<0.20	20.0	<5.0	<5.0
CSO event	1	042908	SL6-2	1:47 PM	18.7	6.42	MP	70	<20,000	<20,000	80,000	3.9	<0.010	0.99	14.0	0.17	0.11	0.027	<5.0	<1.0	<10.0	4.8	<5.0	<0.20	<4.0	<5.0	<0.20	20.0	<5.0	<5.0
CSO event	1	042908	SL6-3	2:51 PM	19.8	6.49	MP	65	<20,000	<20,000	80,000	3.9	<0.010	0.91	10.0	0.17	0.04	0.025	<5.0	<1.0	<10.0	5.0	<5.0	<0.20	<4.0	<5.0	<0.20	20.0	<5.0	<5.0
CSO event	1	052008	SL6-1	11:44 AM	15.2	6.71	12.95	27	>1,600	>1,600	>1,600	<3.0	0.019	0.47	17.0	<0.10	0.57	0.022	<5.0	<1.0	<10.0	3.8	<5.0	0.21	<4.0	<5.0	<0.20	14.0	<5.0	<5.0
CSO event	1	052008	SL6-2	1:11 PM	15.4	6.66	12.61	30	>1,600	>1,600	>1,600	<3.0	0.017	0.51	16.0	<0.10	0.58	0.020	<5.0	<1.0	<10.0	3.7	<5.0	<0.20	<4.0	<5.0	<0.20	13.0	<5.0	<5.0
CSO event	1	052008	SL6-3	2:45 PM	14.45	5.61	12.16	40	>1,600	>1,600	>1,600	<3.0	0.017	0.57	15.0	<0.10	0.72	0.020	<5.0	<1.0	<10.0	3.8	<5.0	<0.20	<4.0	<5.0	<0.20	14.0	<5.0	<5.0

Note:
Sampling analytical testing conducted by Microbac Laboratories, Inc.
SL = Sample Location-Refer to Figure 3
MP = Measurement Problem, DO Probe Malfunction - DO probe either recalibrated in field and/or DO membrane replaced following sampling
1= CSO within 24 Hours
>1 = No CSO within last 24 Hours
CSO event samples collected within 24 hours of activation

APPENDIX C : HUNTING CREEK SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID Date (mmddyy)	Sample ID SL	Field Data Measurments Taken From Sampling Container In the Field Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C mg/L CaCO3	Laboratory Data MPN/100 mL SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221B Total Coliform	mg/L SM 5210B CBOD5	mg/L P or N EPA 365.1 TP	EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	EPA 353.2 NO_2-N	mg/L N EPA 353.2 NO_3-N	µg/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	µg/L SM 3500 CR D Cr VI	mg/L EPA 1664A Oil/Grease
CSO	1	042109	SL-5-1	11:06 AM	14.7	6.71	7.68	80	1,100	500	16,000	2	0.10	1.3	15	0.2	0.95	<0.02	<5	<0.5	<2	4	<2	<0.5	<2	<5	<0.2	20	<10	<5*
CSO	1	042109	SL-5-2	12:27 PM	17.1	6.72	7.84	72	700	3,000	16,000	2	0.11	1.2	26	0.2	1.1	<0.02	<5	<0.5	<2	5	<2	<0.5	<2	<5	<0.2	20	<10	<5*
CSO	1	042109	SL-5-3	2:10 PM	17.6	6.75	7.39	80	1,300	1,300	>=16,000	<1	0.08	0.9	23	0.2	1.1	<0.02	<5	<0.5	<2	4	<2	<0.5	<2	<5	<0.2	10	<10	N/A
Routine	>1	042709	SL-5	9:50 AM	20.9	6.66	6.45	92	300*	700*	9,000*	<1	0.09	1.1	14	0.3	0.93	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	10	<10	<5*
Routine	>1	050509	SL-5	9:57 AM	16.3	6.45	10.75	150	900	1,300	2,000	<1	0.06	1.0	5	<0.2	0.53	<0.02	<5	<0.5	<2	4	<2	<0.5	2	<5	<0.2	20	<10	<5
Routine	>1	051109	SL-5	10:25 AM	16.6	6.53	7.39	100	930	430	2,400	<1	0.18	1.3	17	0.3	1	<0.02	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>1	052109	SL-5	9:55 AM	20.8	6.40	6.12	92	43	150	93	<1	0.07	1.3	2	<0.2	2.8	<0.02	<5	<0.5	3.63	4	<2	<0.5	3	<5	<0.2	20	<10	7
CSO	1	061909	SL-5-1	9:17 AM	22.8	5.60	5.75	46	11,000	2,400	2,400	<1	0.09	1.0	18	<0.2	0.77	<0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	30	<10	<5
CSO	1	061909	SL-5-2	10:10 AM	23.2	5.52	6.25	48	>=24,000	>=24,000	>=24,000	<5	0.08	1.6	23	<0.2	0.78	<0.02	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	5
CSO	1	061909	SL-5-3	11:50 AM	25.1	5.11	7.02	70	>=24,000	11,000	>=24,000	<5	0.18	1.6	31	0.2	12	<0.02	<5	<0.5	<2	4	<2	<0.5	<2	<5	<0.2	30	<10	<5
Routine	>1	080609	SL-5	8:53 AM					1,100'	1,500'	11,000'																			<5'
CSO	1	111409	SL-5-1	9:45 AM																										<5'
CSO	1	111409	SL-5-2	10:45 AM																										<5'
CSO	1	111409	SL-5-3	11:45 AM																										<5'

Note:
Sampling analytical testing conducted by Martel Laboratories, Inc.
SL= Sample Location - Refer To Figure 3.
N/A = Test value unavailable
1= CSO within 24 Hours
>1 = No CSO within last 24 Hours
CSO event samples collected within 24 hours of CSO activation
* = Holding time has been exceeded, additional follow up samples were collected.
' = Follow-up sample

APPENDIX B : HUNTING CREEK SAMPLING RESULTS

Routine or CSO event	Last CSO Event (days)	Sample ID Date (mmddyy)	Sample ID SL SL5	Field Data: Measurments Taken From Sampling Container in the Field Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C mg/L CaCO3	Laboratory Data: MPN/100 mL SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221B Total Coliform	mg/L SM 52106 CBOD5	mg/L P or N EPA 365.1 TP	EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	EPA 353.2 NO_3-N	EPA 353.2 NO_2-N	mg/L N SM 4500NO3-H NO_3NO_2-N	µg/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	µg/L SM 3500 CR D Cr VI	mg/L EPA 1664A O/G/Grease
Routine	>1	041210	SL-5-1	12:05 PM	19.3	8.17	10.81	120	43	23	1,100	<5	0.05	1.1	8	0.4	1.0	<0.02	1.0	<5	<0.5	4	6	<2	<0.5	170	<5	<0.2	30	<10	<5
Routine	>1	041910	SL-5-1	9:10 AM	14.5	6.80	8.33	120	460*	460*	460*	<1	0.08	1.3	8	0.6	<0.2	0.03	2.9	<5	<0.5	<2	3	<2	<0.5	5	<5	<0.2	40	<10	<5
Routine	>1	042610	SL-5-1	9:00 AM	18.4	7.11	7.82	140	240	240	5100	<1	0.11	0.9	9	0.3	1.7	<0.02	1.7	<5	<0.5	<2	2	<2	<0.5	3	<5	<0.2	30	<10	<5
Routine	>1	051010	SL-5-1	9:45 AM	18.0	6.29	10.07	190	75	75	430	<1	0.08	1.7	5	0.6	1.9	<0.02	1.9	<5	<0.5	<2	4	<2	<0.5	3	<5	<0.2	40	<10	<5
CSO	<1	051210	SL-5-1	8:30 AM	16.6	6.47	10.65	240	210*	210*	2400*	3	0.07	1.3	11	<0.2	1.2	<0.2	1.2	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	<10	<10	<5
CSO	<1	051210	SL-5-2	10:05 AM	18.1	6.27	12.40	290	930*	930*	4600*	8	0.04	2.1	6	0.9	2.6	0.02	2.5	<5	<0.5	<2	3	<2	<0.5	3	<5	<0.2	<10	<10	<5
CSO	<1	051210	SL-5-3	11:10 AM	19.3	6.27	10.42	330	1500	1500	4600	<1	0.07	2.4	<1	0.8	3	0.02	3.0	<5	<0.5	<2	3	<2	<0.5	3	<5	<0.2	<10	<10	<5
CSO	<1	073010	SL-5-1	9:10 AM	23.2	6.14	5.98	55	1500	>=24000	>=24000	2	0.09	0.6	12	<0.2	0.9	<.02	0.9	<5	<0.5	<2	2	2	<0.5	<2	<5	<0.2	30	<10	7
CSO	<1	073010	SL-5-2	10:50 AM	26.8	5.36	5.55	80	2100	2100	2100	<1	0.12	1.2	23	<0.2	0.8	< .02	0.8	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	20	<10	<5
CSO	<1	080610	SL-5-1	11:25 AM	-	-	-		11000'	11000'	>=24000'																				
CSO	<1	080610	SL-5-2	12:09 PM	-	-	-		11000'	11000'	>=24000'																				
CSO	<1	080610	SL-5-3	12:42 PM	-	-	-		430	430	1200		0.06	1.2	6	0.3	1.1	<0.02	1.1	<5	<0.5	<2	3	<2	<0.5	3	<5	<0.2	10	<10	<5
Routine	>1	081010	SL-5-1	12:18 PM	-	-	-		430'	430'	930'																				

Note:

Sampling analytical testing conducted by Master Laboratories, Inc.

SL= Sample Location -Refer To Figure 3.

1= CSO within 24 Hours

>1 = No CSO within last 24 Hours

CSO event samples collected within 24 hours of CSO activation

* = Holding time has been exceeded, additional follow up samples were collected.

' = Follow-up sample

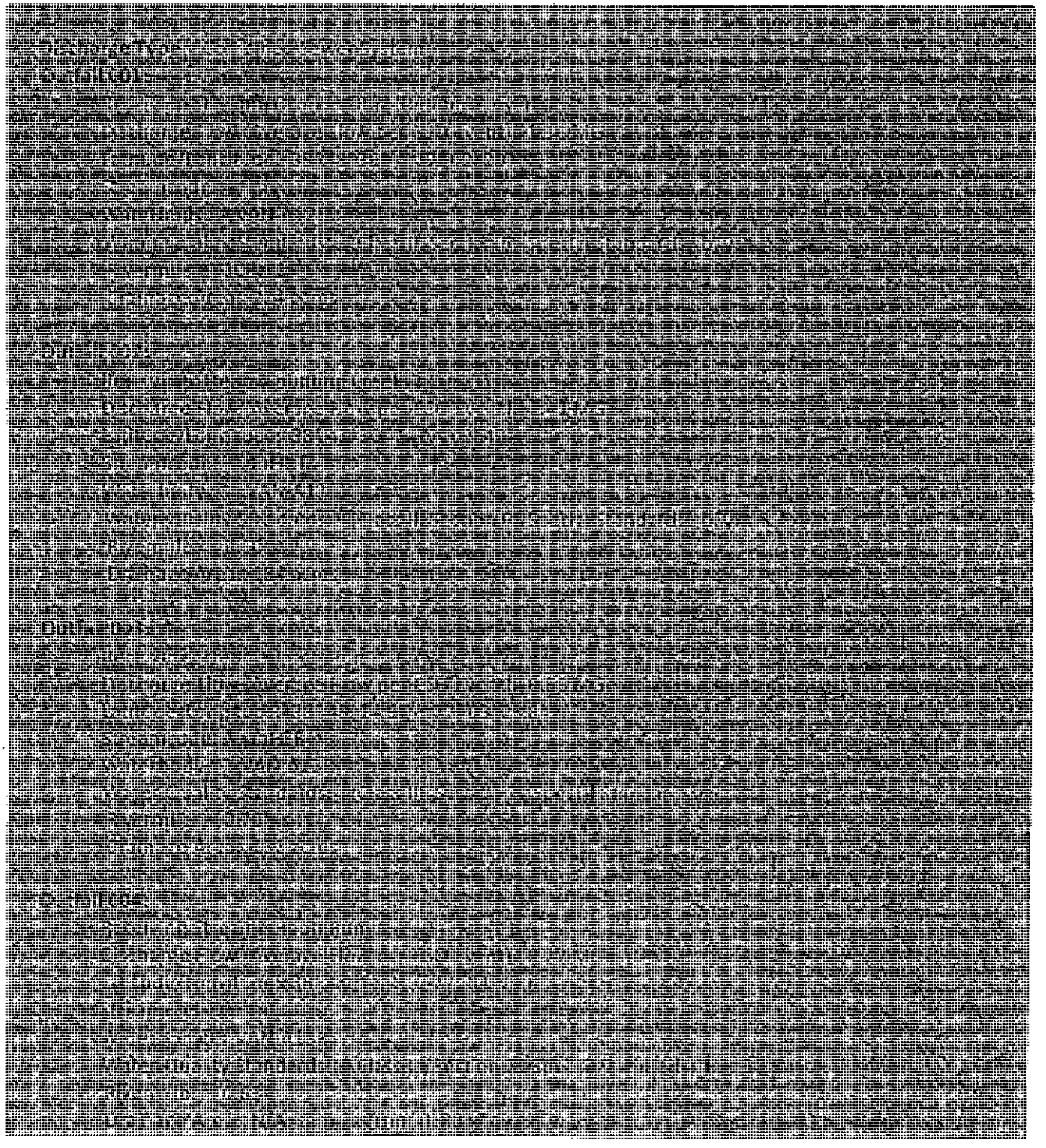
APPENDIX A : HUNTING CREEK SAMPLING RESULTS

Routine or CSO event	Last CSO Event	Sample ID Date (mmddyy)	Sample ID SL SL5	Field Data: Measurments Taken From Sampling Container in the Field Time	Temp (°C)	pH	DO - mg/L	Hardness SM 2340 C mg/L CaCO3	Laboratory Data: MPN/100 mL SM 9221E Fecal C.	SM 9223B E. Coli	SM 9221B Total Coliform	mg/L SM 5210B CBOD5	mg/L P or N EPA 365.1 TP	EPA 351.2 TKN	mg/L SM 2540D TSS	mg/L N SM 4500NH3-G NH_3-N	EPA 353.2 NO_3-N	mg/L N EPA 353.2 NO_2-N	SM 4500NO3-H NO_2-NO_3-N	µg/L EPA 200.8 Antimony	EPA 200.8 Cadmium	EPA 200.8 Cr III	EPA 200.8 Copper	EPA 200.8 Lead	EPA 245.1 Mercury	EPA 200.8 Nickel	EPA 200.8 Selenium	EPA 200.8 Silver	EPA 200.8 Zinc	µg/L SM 3500 CR D Cr VI	mg/L EPA 1664A Oil/Grease
Routine	>24 hrs	071111	SL-5-1	12:00 PM	29.5	6.48	6.25	110	110	110	1,600	<5	0.41	1.8	9	0.4	2.1	0.03	2.1	<5	<0.5	<2	3	<2	<0.5	2	<5	<0.2	30	<10	<5
CSO	<24 hrs	071411	SL-5-1	10:45 AM	25.7	5.80	6.1	150	2300	2300	15000	<5	0.40	1.8	11	0.2	1.5	0.02	1.5	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	<5
CSO	<24 hrs	071411	SL-5-2	11:57 AM	26.0	6.02	6.15	150	930	930	3900	<5	0.26	1.5	6	0.2	0.9	0.02	0.92	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	<5
CSO	<24 hrs	071411	SL-5-3	1:19 PM	27.6	6.24	6.55	62	930	930	9300	<5	0.03	1.2	8	0.2	0.56	0.03	0.59	<5	<0.5	<2	2	<2	<0.5	<2	<5	<0.2	30	<10	6.5
Routine	>24 hrs	071811	SL-5-1	11:15 AM	29.4	8.51	9.32	2	300	80	500	2	0.19	1.3	24	<0.2	0.49	0.03	0.51	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	<5
Routine	>24 hrs	072511	SL-5-1	10:37 AM	30.6	8.90	7.09	120	280	280	5000	2	0.15	1.6	8	<0.2	2.5	0.02	2.5	<5	<0.5	<2	3	<2	<0.5	2	<5	<0.2	10	<10	<5
Routine	>24 hrs	080111	SL-5-1	10:20 AM	31.0	7.02	7.48	130	300	300	1100	2	0.11	1.3	23	<0.2	0.62	0.02	0.64	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	<10	<10	7
CSO	<24 hrs	081511	SL-5-1	10:01 AM	25.3	6.78	7.58	96	3500	1400	30000	2	0.16	0.8	26	<0.2	0.24	<0.02	0.24	<5	<0.5	<2	1	<2	<0.5	<2	<5	<0.2	10	<10	<5
CSO	<24 hrs	081511	SL-5-2	11:36 AM	25.9	6.75	6.96	88	3000	1700	30000	2	0.23	0.8	18	0.3	0.67	<0.02	0.67	<5	<0.5	<2	3	<2	<0.5	<2	<5	<0.2	20	<10	<5
CSO	<24 hrs	081511	SL-5-3	12:30 PM	25.5	6.71	6.54	82	13000	13000	24000	<1	0.17	0.8	17	<0.2	0.72	<0.02	0.72	<5	<0.5	<2	4	<2	<0.5	<2	<5	24	20	<10	<5

Note:
Sampling analytical testing conducted by Martel Laboratories, Inc.
SL= Sample Location -Refer To Figure 3.
<24 hrs = CSO within 24 Hours
>24 hrs = No CSO within last 24 Hours
CSO event samples collected within 24 hours of CSO activation

To: Douglas Frasier
From: Katie Conaway

Date: August 24, 2011
Subject: Planning Statement for Alexandria Combined Sewer System
Permit Number: VA0087068



Attachment 10

1. **Is there monitoring data for the receiving stream? If yes, please attach latest summary. If no, where is the nearest downstream monitoring station?**

Outfall 001: There is no DEQ monitoring data available for this receiving stream. This waterbody flows into the Potomac River, which, at this specific location, is under the jurisdiction of the District of Columbia.

Outfall 002: Yes. The closest DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 0.28 rivermiles from Outfall 002. The following is a monitoring summary for this station, as taken from the 2010 Integrated Assessment:

Class II, Section 6, Special Standard: b, y.

DEQ ambient water quality and fish tissue monitoring statians 1aHUT000.01, at the George Washington Parkway, 1aHUT001.54, 300 yards downstream from Telegraph Road, and 1aHUT001.72, at Route 611/241 (Telegraph Road).

The fish consumption use is categorized as impaired due to a Virginia Department af Health, Division of Health Hozards Control, PCB fish consumption advisary and PCB fish tissue monitaring. Additionally, SPMD data (at station 1aHUT001.54) and water quality data (at station 1aHUT001.72) each revealed exceedances of the human health criteria af 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidal Potomac River watershed has been completed and approved. E. cali monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.

The submerged aquatic vegetation data is ossessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. The wildlife use is considered fully supporting.

Outfall 003: There are no DEQ monitoring stations located on Hooff Run. The closest downstream DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 1.29 rivermiles downstream from Outfall 003. The following is a monitoring summary for this station, as taken from the 2010 Integrated Assessment:

Class II, Section 6, Special Standard: b, y.

DEQ ambient water quality and fish tissue monitoring stations 1aHUT000.01, at the George Washington Parkway, 1aHUT001.54, 300 yards downstream from Telegraph Road, and 1aHUT001.72, at Route 611/241 (Telegraph Road).

The fish consumption use is cotegorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption odvisory ond PCB fish tissue manitoring. Additionally, SPMD data (at stotion 1aHUT001.54) and water quality data (ot station 1aHUT001.72) each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidal Potomoc River watershed has been completed and approved. E. coli monitoring finds o bacterial impairment, resulting in an impoired classification for the recreation use. The wildlife use is considered fully supporting.

The submerged aquatic vegetation data is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. The wildlife use is considered fully supporting.

Outfall 004: There are no DEQ monitoring stations located on Hooff Run. The closest downstream DEQ monitoring station with ambient data is Station 1aHUT000.01, located in the tidal waters of Hunting Creek at the George Washington Memorial Parkway bridge crossing. The station is located approximately 1.22 rivermiles downstream from Outfall 004. The following is a monitoring summary for this station, as taken from the 2010 Integrated Assessment:

Class II, Section 6, Special Standard: b, y.

DEQ ambient water quality and fish tissue monitoring stations 1aHUT000.01, at the George Washington Parkway, 1aHUT001.54, 300 yards downstream from Telegraph Road, and 1aHUT001.72, at Route 611/241 (Telegraph Road).

The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory and PCB fish tissue monitoring. Additionally, SPMD data (at station 1aHUT001.54) and water quality data (at station 1aHUT001.72) each revealed exceedances of the human health criteria of 0.64 parts per billion (ppb) PCBs. A PCB TMDL for the tidol Potomac River watershed has been completed and approved. E. cali monitoring finds a bacterial impairment, resulting in an impaired classification for the recreation use. The wildlife use is considered fully supporting.

The submerged aquatic vegetation dota is assessed as fully supporting the aquatic life use. For the open water aquatic life subuse; the thirty day mean is acceptable, however, the seven day mean and instantaneous levels have not been assessed. The wildlife use is considered fully supporting.

2. **Is the receiving stream on the current 303(d) list?**
   a. **If yes, what is the impairment?**
   b. **Has the TMDL been prepared?**
   c. **If yes, what is the WLA for the discharge?**
   d. **If no, what is the schedule for the TMDL?**

Outfall 001: No. The Virginia portion of the Potomac River (Oronoco Bay) that receives the discharge from Outfall 001 is not currently listed on the 303(d) list.

a. N/A
b. N/A
c. N/A
d. N/A

Outfall 002: Yes. Hunting Creek is on the impaired waters list.

a. Recreational Use Impairment: Sufficient excursions from the maximum E. coli bacteria criterion (17 of 39 samples - 43.6%) were recorded at DEQ's ambient water quality monitoring station (1aHUT000.01) at the George Washington Parkway crossing and (3 of 11 - 27.3%) were recorded at DEQ's ambient water quality monitoring station (1aHUT001.72) at Route 611/241 (Telegraph Road) to assess this stream segment as not supporting the recreation use goal for the 2010 water quality assessment.

Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek. Additionally, there were excursions above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in 6 species) of fish (12 total samples); largemouth bass, carp, white sucker, gizzard shad, white perch and redbreast sunfish collected at monitoring station 1aHUT000.01 in 2008.

b. TMDL for Recreational Use Impairment: Yes. EPA Approved 11/10/2010
TMDL for PCBs in Fish Tissue: Yes. EPA Approved 10/31/2007

c. WLA for Recreational Use Impairment: **6.26E+13 cfu/year** of ***E. coli*** **bacteria. This is an 80% required reduction.**

WLA for PCBs in Fish Tissue Impairment: VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

d. N/A

Outfall 003: No. The receiving stream (non-tidal portion of Hooff Run) has not been assessed by DEQ and therefore, is not on the impaired waters list.

a. N/A
b. N/A
c. N/A
d. N/A

Outfall 004: No. The receiving stream (non-tidal portion of Hooff Run) has not been assessed by DEQ and therefore, is not on the impaired waters list.

a. N/A
b. N/A
c. N/A
d. N/A

3. **If the answer to (2) above is no, is there a downstream 303(d) listed impairment?**
   a. **If yes, what is the impairment?**
   b. **Has a TMDL been prepared?**
   c. **Will the TMDL include the receiving stream?**
   d. **Is there a WLA for the discharge?**
   e. **What is the schedule for the TMDL?**

Outfall 001: Yes. The District of Columbia's portion of the Potomac River that stretches from Haines Point to the Woodrow Wilson Bridge (referred to as the "Lower Potomac" segment in DC's Integrated Assessment) is listed as impaired on the 2010 3030(d) list.

a. Bacteria Impairment, Fecal Coliform Bacteria
Organics Impairment, PCBs

b. Bacteria Impairment – Yes. Completed in 2004
PCB Impairment – Yes. Completed in 2007

c. Bacteria TMDL – Yes.
PCB TMDL – Yes.

d. Bacteria TMDL – No WLA specifically given to the Alexandria CSS.
PCB TMDL – Yes. VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

e. See "b" above.

Outfall 002: N/A

Outfall 003: Yes. There are several downstream listed stream segments, including tidal Hooff Run and tidal Hunting Creek.

a. Tidal Hooff Run Impairment: Fish Consumption Use Impairment: Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek.

Hunting Creek Recreational Use Impairment: Sufficient excursions from the maximum E. coli bacteria criterion (17 of 39 samples - 43.6%) were recorded at DEQ's ambient water quality monitoring station (1aHUT000.01) at the George Washington Parkway crossing and (3 of 11 - 27.3%) were recorded at DEQ's ambient water quality monitoring station (1aHUT001.72) at Route 611/241 (Telegraph Road) to assess this stream segment as not supporting the recreation use goal for the 2010 water quality assessment.

Hunting Creek Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch,

gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek. Additionally, there were excursions above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in 6 species) of fish (12 total samples); largemouth bass, carp, white sucker, gizzard shad, white perch and redbreast sunfish collected at monitoring station 1aHUT000.01 in 2008.

b. TMDL for Recreational Use Impairment: Yes. EPA Approved 11/10/2010
TMDL for PCBs in Fish Tissue: Yes. EPA Approved 10/31/2007

c. While the TMDLs did not specifically include the receiving stream (non-tidal Hooff Run) the TMDLs did include all upstream point sources in the watershed.

d. WLA for Recreational Use Impairment: **7.68E+11 cfu/year of *E. coli* bacteria. This is a 99% required reduction.**

WLA for PCBs in Fish Tissue Impairment: VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

e. See "b" above.

Outfall 004: Yes. There are several downstream listed stream segments, including tidal Hooff Run and tidal Hunting Creek.

a. Tidal Hooff Run Impairment: Fish Consumption Use Impairment: Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek.

Hunting Creek Recreational Use Impairment: Sufficient excursions from the maximum E. coli bacteria criterion (17 of 39 samples - 43.6%) were recorded at DEQ's ambient water quality monitoring station (1aHUT000.01) at the George Washington Parkway crossing and (3 of 11 - 27.3%) were recorded at DEQ's ambient water quality monitoring station (1aHUT001.72) at Route 611/241 (Telegraph Road) to assess this stream segment as not supporting the recreation use goal for the 2010 water quality assessment.

Hunting Creek Fish Consumption Use Impairment: The fish consumption use is categorized as impaired due to a Virginia Department of Health, Division of Health Hazards Control, PCB fish

consumption advisory. The advisory, dated 4/19/99 and modified 12/13/04 and 10/7/09, limits consumption of bullhead catfish, channel catfish less than eighteen inches long, largemouth bass, anadromous (coastal) striped bass, sunfish species, smallmouth bass, white catfish, white perch, gizzard shad, and yellow perch to no more than two meals per month. The advisory also bans the consumption of American eel, carp and channel catfish greater than eighteen inches long. The affected area includes the tidal portions of the following tributaries and embayments from the I-395 bridge (above the Woodrow Wilson Bridge) to the Potomac River Bridge at Route 301: Fourmile Run, Hunting Creek, Little Hunting Creek, Pohick Creek, Accotink Creek, Occoquan River, Neabsco Creek, Powells Creek, Quantico Creek, Chopawamsic Creek, Aquia Creek, and Potomac Creek. Additionally, there were excursions above the water quality criterion based fish tissue value (TV) of 20 parts per billion (ppb) for polychlorinated biphenyls (PCBs) in fish tissue were recorded in 6 species) of fish (12 total samples); largemouth bass, carp, white sucker, gizzard shad, white perch and redbreast sunfish collected at monitoring station 1aHUT000.01 in 2008.

b. TMDL for Recreational Use Impairment: Yes. EPA Approved 11/10/2010
TMDL for PCBs in Fish Tissue: Yes. EPA Approved 10/31/2007

c. While the TMDLs did not specifically include the receiving stream (non-tidal Hooff Run) the TMDLs did include all upstream point sources in the watershed.

d. WLA for Recreational Use Impairment: **8.52E+11 cfu/year of *E. coli* bacteria. This is a 99% required reduction.**

WLA for PCBs in Fish Tissue Impairment: VA0087068 was identified as a source of PCBs in the TMDL, and was provided a Waste Load Allocation.

e. See "b" above.

4. Is there monitoring or other conditions that Planning/Assessment needs in the permit?

- Rather than including a numeric WLA for PCBs, please include the special conditions text regarding PCB monitoring.
- There is a completed downstream TMDL for the aquatic life use impairment for the Chesapeake Bay. However, the Bay TMDL and the WLAs contained within the TMDL are not addressed in this planning statement.

5. Fact Sheet Requirements – Please provide information on other VPDES permits or VADEQ monitoring stations located within a 2 mile radius of the facility. In addition, please provide information on any drinking water intakes located within a 5 mile radius of the facility.

There are several DEQ monitoring stations within a 2 mile radius of this facility:
1aHUT000.01: Hunting Creek at the George Washington Memorial Highway bridge crossing
1aHUT001.54: Hunting Creek, located 300 yards downstream from the Telegraph Road bridge crossing
1aHUT001.72: Hunting Creek at the Telegraph Road bridge crossing

There are several VPDES permitted facilities within a 2 mile radius of this facility:
VA0090107 – Carlyle Development II
VA0025160 – Alexandria Advanced Wastewater Treatment Plant

There are no drinking water intakes within a five mile radius of this facility.

Dissolved Oxygen Criteria (9VAC25-260-185)

Designated Use	Criteria Concentration/Duration	Temporal Application
Migratory fish spawning and nursery	7-day mean > 6 mg/L (tidal habitats with 0-0.5 ppt salinity)	February 1 – May 31
	Instantaneous minimum > 5 mg/L	
Open-water[1,2]	30-day mean > 5.5 mg/L (tidal habitats with 0-0.5 ppt salinity) 30-day mean > 5 mg/L (tidal habitats with >0.5 ppt salinity)	Year-round
	7-day mean > 4 mg/L	
	Instantaneous minimum > 3.2 mg/L at temperatures < 29°C Instantaneous minimum > 4.3 mg/L at temperatures > 29°C	
Deep-water	30-day mean >3 mg/L	June 1-September 30
	1-day mean > 2.3 mg/L	
	Instantaneous minimum > 1.7 mg/L	
Deep-channel	Instantaneous minimum > 1 mg/L	June 1-September 30

[1]See subsection aa of 9VAC25-260-310 for site specific seasonal open-water dissolved oxygen criteria applicable to the tidal Mattaponi and Pamunkey Rivers and their tidal tributaries.

[2]In applying this open-water instantaneous criterion to the Chesapeake Bay and its tidal tributaries where the existing water quality for dissolved oxygen exceeds an instantaneous minimum of 3.2 mg/L, that higher water quality for dissolved oxygen shall be provided antidegradation protection in accordance with section 30 subsection A.2 of the Water Quality Standards.

Outall 001

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
10/26/2007	14.9	6.96	30	0	0.53	0.29	47	12	54	8.3	0
10/26/2007	17.2	6.87	30	0	0.45	0.23	40	13	55	0	0
10/26/2007	17.6	7.42	40	0	0.58	0	34	11	39	0	0
10/26/2007	18.1	7.4	32	0	0.73	0.55	39	15	45	6.2	0
11/15/2007	15.9	7.11	50	11	1	1.5	170	18	30	*	12
11/15/2007	14	7.1	34	12	0.41	0.9	41	16	69	*	0
11/15/2007	14.9	7.05	47	9.6	0.59	1.3	17	14	60	*	0
11/15/2007	13.7	7.25	40	8.5	0.68	1.3	39	16	61	*	0
1/11/2008	10.9	MP	50	13	0.61	1.3	85	10	26	6.3	8
1/11/2008	11.4	MP	40	12	0	1.4	67	14	29	5.7	6
2/1/2008	6.3	6.2	74	48	0.67	1.5	87	11	72	0	5.4
2/1/2008	5	6.86	36	38	0.75	1.2	200	7.4	50	0	5.5
2/1/2008	5.8	6.65	28	24	0.51	1.1	51	12	64	0	13
2/1/2008	6.1	6.81	30	19	0.39	0.88	49	12	61	0	9
2/1/2008	6.8	6.68	48	31	0.57	0.92	42	15	72	6	20

90th percentile:	14.9

90th percentile:	7.4

Average:	39

Temperature	°C
pH	S.U.
CaCO3, cBOD5, TP NH3 and TSS	mg/L
Copper, Zinc, CR VI, O&G	µg/L

MP = Measurement Problem, probe malfunction

*Not Analyzed

Attachment 12

Outall 002

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
4/28/2008	17.8	5.54	23	31	0.3	1.8	22	28	42	5.3	0
4/28/2008	18.1	5.57	22	22	0.26	0.79	16	30	41	5.3	0
4/28/2008	18.2	5.82	20	29	0.39	0.78	17	30	43	6.7	0
4/28/2008	17.2	6.43	4	19	0.2	0.36	0	14	21	0	0
5/9/2008	19	6.31	72	14	0.42	1.3	22	15	42	0	0
5/9/2008	19	6.81	0	7.5	0.21	0.53	23	12	29	0	0
5/9/2008	18.8	6.72	0	4.5	0.21	0.37	28	11	24	0	0
5/9/2008	18.8	6.66	28	7.8	0.28	0.51	20	11	31	0	0
5/9/2008	19	6.74	0	5.4	0.16	0.29	36	9.8	23	0	0
5/12/2008	22.6	5.7	80	6.6	0.41	0.75	26	17	40	0	0
5/12/2008	17.2	5.58	92	5.4	0.4	0.73	21	17	35	0	0
5/12/2008	20.7	5.45	50	6.3	0.32	0.59	19	16	31	0	0
5/12/2008	18.4	5.13	82	6	0.44	0.23	23	15	35	0	0
5/12/2008	24.9	MP	70	6	0.34	0.67	21	17	49	0	0
5/12/2008	26	MP	98	5.4	0.44	0.77	18	35	0	0	0
7/22/2008	26.3	6.68	48	23	1.2	4.7	130	73	51	10	8.2
90th percentile:	25.5										
	90th percentile:	6.7									
		Average:	43								

Temperature	°C
pH	S.U.
CaCO3, cBOD5, TP NH3 and TSS	mg/L
Copper, Zinc, CR VI, O&G	µg/L

MP = Measurement Problem, probe malfunction

Outall 003

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
5/4/2009	16	6.64	44	21	1.2	1.5	52	8	50	0	6
5/4/2009	16.6	7.89	72	39	1.2	2	38	9	20	0	7
5/26/2009	20.9	6.9	470	24	1.1	1.9	71	6	30	0	0
5/26/2009	20.6	6.67	100	31	1.3	2	37	10	30	0	13
6/3/2009	24.9	6.13	140	68	0.46	1.1	100	15	90	0	8
6/3/2009	24.1	6.01	130	17	0.45	0.6	51	12	60	0	7
6/3/2009	24.2	5.87	130	15	0.47	1.1	71	8	50	0	7
6/3/2009	22.1	6.54	110	92	1.2	2.5	47	9	50	0	15
7/23/2009	27.2	6.46	140	42	1.3	3.4	78	19	70	0	7
7/23/2009	26.7	6.27	150	49	1.3	4	72	22	80	0	15

90th percentile:	26.8		
	90th percentile:	7.0	
		Average:	149

Temperature	°C
pH	S.U.
CaCO3, cBOD5, TP NH3 and TSS	mg/L
Copper, Zinc, CR VI, O&G	µg/L

Outall 004

Date	Temperature	pH	CaCO3	cBOD5	TP	NH3	TSS	Copper	Zinc	Cr VI	O&G
5/3/2010	21.5	7.35	270	99	3.5	18	90	6	10	0	13
5/3/2010	21.4	7.84	350	91	3.7	18	88	6	10	0	15
5/3/2010	21.2	7.53	480	91	4.1	19	140	5	0	0	14
6/1/2010	24.2	5.75	80	10	0.8	0.8	53	7	200	0	0
6/1/2010	24.5	6.75	95	32	0.7	2.9	78	8	50	0	0
7/10/2010	26.1	7	50	59	1.8	8.2	34	13	50	0	12
7/10/2010	26	6.75	44	56	1.6	7.8	55	12	50	0	9
7/10/2010	25.9	6.29	52	59	1.3	4.7	82	6	40	0	11
7/10/2010	26.1	6.91	78	71	1.6	5.7	73	9	50	0	13
7/29/2010	29.5	6.7	210	78	1.9	6.7	250	7	40	0	16
7/29/2010	29.5	7.06	80	53	1.4	7.3	95	18	70	0	12
7/29/2010	27.7	6.38	90	56	1.4	3.7	150	5	40	0	11
7/29/2010	27	6.5	100	71	1.8	6.9	71	0	20	0	32
90th percentile:	29.1										
	90th percentile:	7.3									
		Average:	152								

Temperature	°C
pH	S.U.
CaCO3, cBOD5, TP NH3 and TSS	mg/L
Copper, Zinc, CR VI, O&G	µg/L

MP = Measurement Problem, probe malfunction

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS - Outfall 001 Permit No.: VA0087068

Receiving Stream: Oronoco Bay Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	134 mg/L	1Q10 (Annual) =	1 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	39 mg/L
90% Temperature (Annual) =	30 deg C	7Q10 (Annual) =	1 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	25 deg C
90% Temperature (Wet season) =	19 deg C	30Q10 (Annual) =	1 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	15 deg C
90% Maximum pH =	7.8 SU	1Q10 (Wet season) =	1 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	7.4 SU
10% Maximum pH =	6.3 SU	30Q10 (Wet season)	1 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6.7 SU
Tier Designation (1 or 2) =	1	30Q5 =	1 MGD			Discharge Flow =	1 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	1 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	1.83E+01	1.80E+00	na	--	3.7E+01	3.6E+00	na	--	--	--	--	--	--	--	--	--	3.7E+01	3.6E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	1.83E+01	3.54E+00	na	--	3.7E+01	7.1E+00	na	--	--	--	--	--	--	--	--	--	3.7E+01	7.1E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	3.3E+00	1.0E+00	na	--	6.7E+00	2.0E+00	na	--	--	--	--	--	--	--	--	--	6.7E+00	2.0E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Attachment 13

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	5.1E+02	6.6E+01	na	--	1.0E+03	1.3E+02	na	--	--	--	--	--	--	--	--	--	1.0E+03	1.3E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.2E+01	7.9E+00	na	--	2.3E+01	1.6E+01	na	--	--	--	--	--	--	--	--	--	2.3E+01	1.6E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD[C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE[C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	9.9E+01	1.1E+01	na	--	2.0E+02	2.2E+01	na	--	--	--	--	--	--	--	--	--	2.0E+02	2.2E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	1.6E+02	1.6E+01	na	4.6E+03	3.2E+02	3.6E+01	na	9.2E+03	--	--	--	--	--	--	--	--	3.2E+02	3.6E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol [C]	0	5.0E+00	3.9E+00	na	3.0E+01	1.0E+01	7.7E+00	na	6.0E+01	--	--	--	--	--	--	--	--	1.0E+01	7.7E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	2.7E+00	--	na	--	5.4E+00	--	na	--	--	--	--	--	--	--	--	--	5.4E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	1.0E+02	1.0E+02	na	2.6E+04	2.1E+02	2.1E+02	na	5.2E+04	--	--	--	--	--	--	--	--	2.1E+02	2.1E+02	na	5.2E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.2E+00
Chromium III	7.9E+01
Chromium VI	1.3E+01
Copper	9.4E+00
Iron	na
Lead	1.3E+01
Manganese	na
Mercury	9.2E-01
Nickel	2.2E+01
Selenium	6.0E+00
Silver	2.2E+00
Zinc	8.3E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS - Outfall 002 Permit No.: VA0087068

Receiving Stream: Hunting Creek Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	106 mg/L	1Q10 (Annual) =	1 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	43 mg/L
90% Temperature (Annual) =	29 deg C	7Q10 (Annual) =	1 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	25.5 deg C
90% Temperature (Wet season) =	20 deg C	30Q10 (Annual) =	1 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	15 deg C
90% Maximum pH =	7.1 SU	1Q10 (Wet season) =	1 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	6.7 SU
10% Maximum pH =	5.6 SU	30Q10 (Wet season)	1 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	5.5 SU
Tier Designation (1 or 2) =	1	30Q5 =	1 MGD			Discharge Flow =	1 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	1 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin [C]	0	3.0E+00	--	ne	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	4.05E+01	2.73E+00	na	--	8.1E+01	5.5E+00	na	--	--	--	--	--	--	--	--	--	8.1E+01	5.5E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	4.05E+01	5.12E+00	na	--	8.1E+01	1.0E+01	na	--	--	--	--	--	--	--	--	--	8.1E+01	1.0E+01	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	ne	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	2.8E+00	9.0E-01	na	--	5.6E+00	1.8E+00	na	--	--	--	--	--	--	--	--	--	5.6E+00	1.8E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	4.5E+02	5.8E+01	na	--	9.0E+02	1.2E+02	na	--	--	--	--	--	--	--	--	--	9.0E+02	1.2E+02	na	--
Chromium VI	0	1.5E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene[C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.0E+01	7.0E+00	na	--	2.0E+01	1.4E+01	na	--	--	--	--	--	--	--	--	--	2.0E+01	1.4E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD[C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE[C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT[C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene[C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.5E+03	--	--	--	--	--	--	--	--	--	--	na	2.5E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane[C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane[C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropene[C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin[C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene[C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	8.2E+01	9.3E+00	na	--	1.6E+02	1.9E+01	na	--	--	--	--	--	--	--	--	--	1.6E+02	1.9E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	1.4E+02	1.6E+01	na	4.6E+03	2.8E+02	3.2E+01	na	9.2E+03	--	--	--	--	--	--	--	--	2.8E+02	3.2E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol [C]	0	2.0E+00	1.6E+00	na	3.0E+01	4.1E+00	3.1E+00	na	6.0E+01	--	--	--	--	--	--	--	--	4.1E+00	3.1E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	ne	8.4E+03
Silver	0	2.1E+00	--	na	--	4.2E+00	--	na	--	--	--	--	--	--	--	--	--	4.2E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	9.1E+01	9.2E+01	na	2.6E+04	1.8E+02	1.8E+02	na	5.2E+04	--	--	--	--	--	--	--	--	1.8E+02	1.8E+02	na	5.2E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.1E+00
Chromium III	7.0E+01
Chromium VI	1.3E+01
Copper	8.1E+00
Iron	na
Lead	1.1E+01
Manganese	na
Mercury	9.2E-01
Nickel	1.9E+01
Selenium	6.0E+00
Silver	1.7E+00
Zinc	7.3E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS - Outfall 003 Permit No.: VA0087068

Receiving Stream: Hooffs Run Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	108 mg/L	1Q10 (Annual) =	1 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	149 mg/L
90% Temperature (Annual) =	29 deg C	7Q10 (Annual) =	1 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	26.8 deg C
90% Temperature (Wet season) =	20 deg C	30Q10 (Annual) =	1 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	15 deg C
90% Maximum pH =	7.1 SU	1Q10 (Wet season) =	1 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	7 SU
10% Maximum pH =	5.6 SU	30Q10 (Wet season)	1 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6 SU
Tier Designation (1 or 2) =	1	30Q5 =	1 MGD			Discharge Flow =	1 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	1 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	3.46E+01	2.45E+00	na	--	6.9E+01	4.9E+00	na	--	--	--	--	--	--	--	--	--	6.9E+01	4.9E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	3.46E+01	4.79E+00	na	--	6.9E+01	9.6E+00	na	--	--	--	--	--	--	--	--	--	6.9E+01	9.6E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	5.2E+00	1.4E+00	na	--	1.0E+01	2.7E+00	na	--	--	--	--	--	--	--	--	--	1.0E+01	2.7E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	7.0E+02	9.0E+01	na	--	1.4E+03	1.8E+02	na	--	--	--	--	--	--	--	--	--	1.4E+03	1.8E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.7E+01	1.1E+01	na	--	3.4E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.4E+01	2.2E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD [C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE [C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [C]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide [C]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene [C]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene [C]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane Alpha-BHC [C]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane Beta-BHC [C]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane Gamma-BHC [C] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane [C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone [C]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.6E+02	1.8E+01	na	--	3.2E+02	3.7E+01	na	--	--	--	--	--	--	--	--	--	3.2E+02	3.7E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride [C]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.2E+02	2.5E+01	na	4.6E+03	4.5E+02	5.0E+01	na	9.2E+03	--	--	--	--	--	--	--	--	4.5E+02	5.0E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine [C]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine [C]	0	--	--	na	5.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine [C]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total [C]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol [C]	0	2.5E+00	1.9E+00	na	3.0E+01	5.0E+00	3.8E+00	na	6.0E+01	--	--	--	--	--	--	--	--	5.0E+00	3.8E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	5.2E+00	--	na	--	1.0E+01	--	na	--	--	--	--	--	--	--	--	--	1.0E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	1.4E+02	1.5E+02	na	2.6E+04	2.9E+02	2.9E+02	na	5.2E+04	--	--	--	--	--	--	--	--	2.9E+02	2.9E+02	na	5.2E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.6E+00
Chromium III	1.1E+02
Chromium VI	1.3E+01
Copper	1.3E+01
Iron	na
Lead	2.2E+01
Manganese	na
Mercury	9.2E-01
Nickel	3.0E+01
Selenium	6.0E+00
Silver	4.2E+00
Zinc	1.2E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: City of Alexandria CSS - Outfall 004 Permit No.: VA0087068

Receiving Stream: Hooffs Run Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information		Stream Flows		Mixing Information		Effluent Information	
Mean Hardness (as CaCO3) =	105 mg/L	1Q10 (Annual) =	1 MGD	Annual - 1Q10 Mix =	100 %	Mean Hardness (as CaCO3) =	152 mg/L
90% Temperature (Annual) =	29 deg C	7Q10 (Annual) =	1 MGD	- 7Q10 Mix =	100 %	90% Temp (Annual) =	29.1 deg C
90% Temperature (Wet season) =	20 deg C	30Q10 (Annual) =	1 MGD	- 30Q10 Mix =	100 %	90% Temp (Wet season) =	15 deg C
90% Maximum pH =	7.1 SU	1Q10 (Wet season) =	1 MGD	Wet Season - 1Q10 Mix =	100 %	90% Maximum pH =	7.3 SU
10% Maximum pH =	5.6 SU	30Q10 (Wet season)	1 MGD	- 30Q10 Mix =	100 %	10% Maximum pH =	6.3 SU
Tier Designation (1 or 2) =	1	30Q5 =	1 MGD			Discharge Flow =	1 MGD
Public Water Supply (PWS) Y/N? =	n	Harmonic Mean =	1 MGD				
Trout Present Y/N? =	n						
Early Life Stages Present Y/N? =	y						

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenapthene	0	--	--	na	9.9E+02	--	--	na	2.0E+03	--	--	--	--	--	--	--	--	--	--	na	2.0E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.9E+01	--	--	--	--	--	--	--	--	--	--	na	1.9E+01
Acrylonitrile [C]	0	--	--	na	2.5E+00	--	--	na	5.0E+00	--	--	--	--	--	--	--	--	--	--	na	5.0E+00
Aldrin [C]	0	3.0E+00	--	na	5.0E-04	6.0E+00	--	na	1.0E-03	--	--	--	--	--	--	--	--	6.0E+00	--	na	1.0E-03
Ammonia-N (mg/l) (Yearly)	0	2.99E+01	2.12E+00	na	--	6.0E+01	4.2E+00	na	--	--	--	--	--	--	--	--	--	6.0E+01	4.2E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	2.99E+01	4.47E+00	na	--	6.0E+01	8.9E+00	na	--	--	--	--	--	--	--	--	--	6.0E+01	8.9E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	8.0E+04	--	--	--	--	--	--	--	--	--	--	na	8.0E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.3E+03	--	--	--	--	--	--	--	--	--	--	na	1.3E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	6.8E+02	3.0E+02	na	--	--	--	--	--	--	--	--	--	6.8E+02	3.0E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Benzene [C]	0	--	--	na	5.1E+02	--	--	na	1.0E+03	--	--	--	--	--	--	--	--	--	--	na	1.0E+03
Benzidine [C]	0	--	--	na	2.0E-03	--	--	na	4.0E-03	--	--	--	--	--	--	--	--	--	--	na	4.0E-03
Benzo (a) anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (b) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (k) fluoranthene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Benzo (a) pyrene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Bis2-Chloroethyl Ether [C]	0	--	--	na	5.3E+00	--	--	na	1.1E+01	--	--	--	--	--	--	--	--	--	--	na	1.1E+01
Bis2-Chloroisopropyl Ether	0	--	--	na	6.5E+04	--	--	na	1.3E+05	--	--	--	--	--	--	--	--	--	--	na	1.3E+05
Bis 2-Ethylhexyl Phthalate [C]	0	--	--	na	2.2E+01	--	--	na	4.4E+01	--	--	--	--	--	--	--	--	--	--	na	4.4E+01
Bromoform [C]	0	--	--	na	1.4E+03	--	--	na	2.8E+03	--	--	--	--	--	--	--	--	--	--	na	2.8E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.8E+03	--	--	--	--	--	--	--	--	--	--	na	3.8E+03
Cadmium	0	5.2E+00	1.4E+00	na	--	1.0E+01	2.8E+00	na	--	--	--	--	--	--	--	--	--	1.0E+01	2.8E+00	na	--
Carbon Tetrachloride [C]	0	--	--	na	1.6E+01	--	--	na	3.2E+01	--	--	--	--	--	--	--	--	--	--	na	3.2E+01
Chlordane [C]	0	2.4E+00	4.3E-03	na	8.1E-03	4.8E+00	8.6E-03	na	1.6E-02	--	--	--	--	--	--	--	--	4.8E+00	8.6E-03	na	1.6E-02
Chloride	0	8.6E+05	2.3E+05	na	--	1.7E+06	4.6E+05	na	--	--	--	--	--	--	--	--	--	1.7E+06	4.6E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	3.8E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.8E+01	2.2E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane[C]	0	--	--	na	1.3E+02	--	--	na	2.6E+02	--	--	--	--	--	--	--	--	--	--	na	2.6E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	2.2E+04	--	--	--	--	--	--	--	--	--	--	na	2.2E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	3.2E+03	--	--	--	--	--	--	--	--	--	--	na	3.2E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	1.7E-01	8.2E-02	na	--	--	--	--	--	--	--	--	--	1.7E-01	8.2E-02	na	--
Chromium III	0	7.0E+02	9.1E+01	na	--	1.4E+03	1.8E+02	na	--	--	--	--	--	--	--	--	--	1.4E+03	1.8E+02	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	3.2E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.2E+01	2.2E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Chrysene [C]	0	--	--	na	1.8E-02	--	--	na	3.6E-02	--	--	--	--	--	--	--	--	--	--	na	3.6E-02
Copper	0	1.7E+01	1.1E+01	na	--	3.4E+01	2.2E+01	na	--	--	--	--	--	--	--	--	--	3.4E+01	2.2E+01	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	4.4E+01	1.0E+01	na	3.2E+04	--	--	--	--	--	--	--	--	4.4E+01	1.0E+01	na	3.2E+04
DDD [C]	0	--	--	na	3.1E-03	--	--	na	6.2E-03	--	--	--	--	--	--	--	--	--	--	na	6.2E-03
DDE [C]	0	--	--	na	2.2E-03	--	--	na	4.4E-03	--	--	--	--	--	--	--	--	--	--	na	4.4E-03
DDT [C]	0	1.1E+00	1.0E-03	na	2.2E-03	2.2E+00	2.0E-03	na	4.4E-03	--	--	--	--	--	--	--	--	2.2E+00	2.0E-03	na	4.4E-03
Demeton	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	3.4E-01	3.4E-01	na	--	--	--	--	--	--	--	--	--	3.4E-01	3.4E-01	na	--
Dibenz(a,h)anthracene [C]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.6E+03	--	--	--	--	--	--	--	--	--	--	na	2.6E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.9E+03	--	--	--	--	--	--	--	--	--	--	na	1.9E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.8E+02	--	--	--	--	--	--	--	--	--	--	na	3.8E+02
3,3-Dichlorobenzidine[C]	0	--	--	na	2.8E-01	--	--	na	5.6E-01	--	--	--	--	--	--	--	--	--	--	na	5.6E-01
Dichlorobromomethane [C]	0	--	--	na	1.7E+02	--	--	na	3.4E+02	--	--	--	--	--	--	--	--	--	--	na	3.4E+02
1,2-Dichloroethane [C]	0	--	--	na	3.7E+02	--	--	na	7.4E+02	--	--	--	--	--	--	--	--	--	--	na	7.4E+02
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.4E+04	--	--	--	--	--	--	--	--	--	--	na	1.4E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	2.0E+04	--	--	--	--	--	--	--	--	--	--	na	2.0E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	5.8E+02	--	--	--	--	--	--	--	--	--	--	na	5.8E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,2-Dichloropropane[C]	0	--	--	na	1.5E+02	--	--	na	3.0E+02	--	--	--	--	--	--	--	--	--	--	na	3.0E+02
1,3-Dichloropropene [C]	0	--	--	na	2.1E+02	--	--	na	4.2E+02	--	--	--	--	--	--	--	--	--	--	na	4.2E+02
Dieldrin [C]	0	2.4E-01	5.6E-02	na	5.4E-04	4.8E-01	1.1E-01	na	1.1E-03	--	--	--	--	--	--	--	--	4.8E-01	1.1E-01	na	1.1E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	8.8E+04	--	--	--	--	--	--	--	--	--	--	na	8.8E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.7E+03	--	--	--	--	--	--	--	--	--	--	na	1.7E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	2.2E+06	--	--	--	--	--	--	--	--	--	--	na	2.2E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	9.0E+03	--	--	--	--	--	--	--	--	--	--	na	9.0E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	5.6E+02	--	--	--	--	--	--	--	--	--	--	na	5.6E+02
2,4-Dinitrotoluene [C]	0	--	--	na	3.4E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.8E+01
Dioxin 2,3,7,8-tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	1.0E-07	--	--	--	--	--	--	--	--	--	--	na	1.0E-07
1,2-Diphenylhydrazine[C]	0	--	--	na	2.0E+00	--	--	na	4.0E+00	--	--	--	--	--	--	--	--	--	--	na	4.0E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	4.4E-01	1.1E-01	na	1.8E+02	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	na	1.8E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	4.4E-01	1.1E-01	--	--	--	--	--	--	--	--	--	--	4.4E-01	1.1E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.8E+02	--	--	--	--	--	--	--	--	--	--	na	1.8E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	1.7E-01	7.2E-02	na	1.2E-01	--	--	--	--	--	--	--	--	1.7E-01	7.2E-02	na	1.2E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	6.0E-01	--	--	--	--	--	--	--	--	--	--	na	6.0E-01

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	4.2E+03	--	--	--	--	--	--	--	--	--	--	na	4.2E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.8E+02	--	--	--	--	--	--	--	--	--	--	na	2.8E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	1.1E+04	--	--	--	--	--	--	--	--	--	--	na	1.1E+04
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	2.0E-02	na	--	--	--	--	--	--	--	--	--	--	2.0E-02	na	--
Heptachlor [c]	0	5.2E-01	3.8E-03	na	7.9E-04	1.0E+00	7.6E-03	na	1.6E-03	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	1.6E-03
Heptachlor Epoxide[c]	0	5.2E-01	3.8E-03	na	3.9E-04	1.0E+00	7.6E-03	na	7.8E-04	--	--	--	--	--	--	--	--	1.0E+00	7.6E-03	na	7.8E-04
Hexachlorobenzene[c]	0	--	--	na	2.9E-03	--	--	na	5.8E-03	--	--	--	--	--	--	--	--	--	--	na	5.8E-03
Hexachlorobutadiene[c]	0	--	--	na	1.8E+02	--	--	na	3.6E+02	--	--	--	--	--	--	--	--	--	--	na	3.6E+02
Hexachlorocyclohexane Alpha-BHC[c]	0	--	--	na	4.9E-02	--	--	na	9.8E-02	--	--	--	--	--	--	--	--	--	--	na	9.8E-02
Hexachlorocyclohexane Beta-BHC[c]	0	--	--	na	1.7E-01	--	--	na	3.4E-01	--	--	--	--	--	--	--	--	--	--	na	3.4E-01
Hexachlorocyclohexane Gamma-BHC[c] (Lindane)	0	9.5E-01	na	na	1.8E+00	1.9E+00	--	na	3.6E+00	--	--	--	--	--	--	--	--	1.9E+00	--	na	3.6E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	2.2E+03	--	--	--	--	--	--	--	--	--	--	na	2.2E+03
Hexachloroethane[c]	0	--	--	na	3.3E+01	--	--	na	6.6E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Hydrogen Sulfide	0	--	2.0E+00	ne	--	--	4.0E+00	na	--	--	--	--	--	--	--	--	--	--	4.0E+00	na	--
Indeno (1,2,3-cd) pyrene [c]	0	--	--	na	1.8E-01	--	--	na	3.6E-01	--	--	--	--	--	--	--	--	--	--	na	3.6E-01
Iron	0	--	--	na	--	--	--	ne	--	--	--	--	--	--	--	--	--	--	--	na	--
Isophorone[c]	0	--	--	na	9.6E+03	--	--	na	1.9E+04	--	--	--	--	--	--	--	--	--	--	na	1.9E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Lead	0	1.6E+02	1.9E+01	na	--	3.3E+02	3.7E+01	na	--	--	--	--	--	--	--	--	--	3.3E+02	3.7E+01	na	--
Malathion	0	--	1.0E-01	na	--	--	2.0E-01	na	--	--	--	--	--	--	--	--	--	--	2.0E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	2.8E+00	1.5E+00	--	--	--	--	--	--	--	--	--	--	2.8E+00	1.5E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	3.0E+03	--	--	--	--	--	--	--	--	--	--	na	3.0E+03
Methylene Chloride [c]	0	--	--	na	5.9E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Methoxychlor	0	--	3.0E-02	na	--	--	6.0E-02	na	--	--	--	--	--	--	--	--	--	--	6.0E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	--	--	--	--	--	--	--	--	0.0E+00	na	--
Nickel	0	2.3E+02	2.5E+01	na	4.6E+03	4.5E+02	5.0E+01	na	9.2E+03	--	--	--	--	--	--	--	--	4.5E+02	5.0E+01	na	9.2E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.4E+03	--	--	--	--	--	--	--	--	--	--	na	1.4E+03
N-Nitrosodimethylamine[c]	0	--	--	na	3.0E+01	--	--	na	6.0E+01	--	--	--	--	--	--	--	--	--	--	na	6.0E+01
N-Nitrosodiphenylamine[c]	0	--	--	na	6.0E+01	--	--	na	1.2E+02	--	--	--	--	--	--	--	--	--	--	na	1.2E+02
N-Nitrosodi-n-propylamine[c]	0	--	--	na	5.1E+00	--	--	na	1.0E+01	--	--	--	--	--	--	--	--	--	--	na	1.0E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	5.6E+01	1.3E+01	na	--	--	--	--	--	--	--	--	--	5.6E+01	1.3E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	1.3E-01	2.6E-02	na	--	--	--	--	--	--	--	--	--	1.3E-01	2.6E-02	na	--
PCB Total[c]	0	--	1.4E-02	na	6.4E-04	--	2.8E-02	na	1.3E-03	--	--	--	--	--	--	--	--	--	2.8E-02	na	1.3E-03
Pentachlorophenol [c]	0	2.7E+00	2.0E+00	na	3.0E+01	5.3E+00	4.1E+00	na	6.0E+01	--	--	--	--	--	--	--	--	5.3E+00	4.1E+00	na	6.0E+01
Phenol	0	--	--	na	8.6E+05	--	--	na	1.7E+06	--	--	--	--	--	--	--	--	--	--	na	1.7E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	8.0E+03	--	--	--	--	--	--	--	--	--	--	na	8.0E+03
Radionuclides	0	--	--	na	--	--	--	ne	--	--	--	--	--	--	--	--	--	--	--	na	--
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	8.0E+00	--	--	--	--	--	--	--	--	--	--	na	8.0E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--

Parameter	Background	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
(ug/l unless noted)	Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	4.0E+01	1.0E+01	na	8.4E+03	--	--	--	--	--	--	--	--	4.0E+01	1.0E+01	na	8.4E+03
Silver	0	5.3E+00	--	na	--	1.1E+01	--	na	--	--	--	--	--	--	--	--	--	1.1E+01	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
1,1,2,2-Tetrachloroethane[C]	0	--	--	na	4.0E+01	--	--	na	8.0E+01	--	--	--	--	--	--	--	--	--	--	na	8.0E+01
Tetrachloroethylene[C]	0	--	--	na	3.3E+01	--	--	na	6.8E+01	--	--	--	--	--	--	--	--	--	--	na	6.6E+01
Thallium	0	--	--	na	4.7E-01	--	--	na	9.4E-01	--	--	--	--	--	--	--	--	--	--	na	9.4E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.2E+04	--	--	--	--	--	--	--	--	--	--	na	1.2E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Toxaphene [C]	0	7.3E-01	2.0E-04	na	2.8E-03	1.5E+00	4.0E-04	na	5.6E-03	--	--	--	--	--	--	--	--	1.5E+00	4.0E-04	na	5.6E-03
Tributyltin	0	4.6E-01	7.2E-02	na	--	9.2E-01	1.4E-01	na	--	--	--	--	--	--	--	--	--	9.2E-01	1.4E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.4E+02	--	--	--	--	--	--	--	--	--	--	na	1.4E+02
1,1,2-Trichloroethane[C]	0	--	--	na	1.6E+02	--	--	na	3.2E+02	--	--	--	--	--	--	--	--	--	--	na	3.2E+02
Trichloroethylene [C]	0	--	--	na	3.0E+02	--	--	na	6.0E+02	--	--	--	--	--	--	--	--	--	--	na	6.0E+02
2,4,6-Trichlorophenol [C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	--	--	--	--	--	--	--	--	na	--
Vinyl Chloride[C]	0	--	--	na	2.4E+01	--	--	na	4.8E+01	--	--	--	--	--	--	--	--	--	--	na	4.8E+01
Zinc	0	1.5E+02	1.5E+02	na	2.6E+04	2.9E+02	2.9E+02	na	5.2E+04	--	--	--	--	--	--	--	--	2.9E+02	2.9E+02	na	5.2E+04

Notes:

1. All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
2. Discharge flow is highest montnly average or Form 2C maximum for Industries and design flow for Municipals
3. Metals measured as Dissolved, unless specified otherwise
4. "C" indicates a carcinogenic parameter
5. Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
   Antidegradation WLAs are based upon a complete mix.
6. Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
   = (0.1(WQC - background conc.) + background conc.) for human health
7. WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.3E+03
Arsenic	1.8E+02
Barium	na
Cadmium	1.7E+00
Chromium III	1.1E+02
Chromium VI	1.3E+01
Copper	1.3E+01
Iron	na
Lead	2.2E+01
Manganese	na
Mercury	9.2E-01
Nickel	3.0E+01
Selenium	6.0E+00
Silver	4.3E+00
Zinc	1.2E+02

Note: do not use QL's lower than the minimum QL's provided in agency guidance

8/17/2012 2:50:43 PM

Facility = City of Alexandria CSS - Outfall 001
Chemical = Copper
Chronic averaging period = 4
WLAa = 23
WLAc =
Q.L. = 9.4
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 15
Expected Value = 13.2398
Variance = 6.10592
C.V. = 0.186634
97th percentile daily values = 18.3681
97th percentile 4 day average = 15.7058
97th percentile 30 day average= 14.0884
< Q.L. = 1
Model used = delta lognormal

No Limit is required for this material

The data are:

12
13
11
15
18
16
14
16
10
14
11
7.4
12
12
15

8/17/2012 2:52:25 PM

Facility = City of Alexandria CSS - Outfall 001
Chemical = Zinc
Chronic averaging period = 4
WLAa = 210
WLAc =
Q.L. = 83
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 15
Expected Value = 13.2398
Variance = 6.10592
C.V. = 0.186634
97th percentile daily values = 18.3681
97th percentile 4 day average = 15.7058
97th percentile 30 day average= 14.0884
< Q.L. = 15
Model used = delta lognormal

No Limit is required for this material

The data are:

54
55
39
45
30
69
60
61
26
29
72
50
64
61
72

8/17/2012 4:33:28 PM

Facility = City of Alexandria CSS - Outfall 002
Chemical = Copper
Chronic averaging period = 4
WLAa = 20
WLAc =
Q.L. = 8.1
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 16
Expected Value = 19.8167
Variance = 135.042
C.V. = 0.586410
97th percentile daily values = 48.1376
97th percentile 4 day average = 32.6379
97th percentile 30 day average= 23.8076
< Q.L. = 1
Model used = delta lognormal

A limit is needed based on Acute Toxicity
Maximum Daily Limit = 20
Average Weekly limit = 20
Average Monthly Limit = 20

The data are:

28
30
30
14
15
12
11
11
9.8
17
17
16
15
17
3.5
73

8/17/2012 4:34:57 PM

Facility = City of Alexandria CSS - Outfall 002
Chemical = Zinc
Chronic averaging period = 4
WLAa = 180
WLAc =
Q.L. = 73
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 15
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 15
Model used =

No Limit is required for this material

The data are:

42
41
43
21
42
29
24
31
23
40
35
31
35
49
51

8/17/2012 4:52:20 PM

Facility = City of Alexandria CSS - Outfall 003
Chemical = Copper
Chronic averaging period = 4
WLAa = 34
WLAc =
Q.L. = 13
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value = 11.3351
Variance = 46.2545
C.V. = 0.6
97th percentile daily values = 27.5830
97th percentile 4 day average = 18.8592
97th percentile 30 day average= 13.6707
< Q.L. = 7
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

8
9
6
10
15
12
8
9
19
22

8/17/2012 4:53:36 PM

Facility = City of Alexandria CSS - Outfall 003
Chemical = Zinc
Chronic averaging period = 4
WLAa = 290
WLAc =
Q.L. = 120
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 10
Expected Value =
Variance =
C.V. =
97th percentile daily values =
97th percentile 4 day average =
97th percentile 30 day average=
< Q.L. = 10
Model used =

No Limit is required for this material

The data are:

50
20
30
30
90
60
50
50
70
80

8/17/2012 4:56:56 PM

Facility = City of Alexandria CSS - Outfall 004
Chemical = Copper
Chronic averaging period = 4
WLAa = 34
WLAc =
Q.L. = 13
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 12
Expected Value = 8.93141
Variance = 28.7172
C.V. = 0.6
97th percentile daily values = 21.7338
97th percentile 4 day average = 14.8600
97th percentile 30 day average= 10.7717
< Q.L. = 10
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

6
6
5
7
8
13
12
6
9
7
18
5

8/17/2012 4:57:59 PM

Facility = City of Alexandria CSS - Outfall 004
Chemical = Zinc
Chronic averaging period = 4
WLAa = 290
WLAc =
Q.L. = 120
# samples/mo. = 1
# samples/wk. = 1

Summary of Statistics:

observations = 12
Expected Value = 66.5286
Variance = 1593.38
C.V. = 0.6
97th percentile daily values = 161.891
97th percentile 4 day average = 110.689
97th percentile 30 day average= 80.2370
< Q.L. = 11
Model used = BPJ Assumptions, Type 1 data

No Limit is required for this material

The data are:

10
10
200
50
50
50
40
50
40
70
40
20

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 20 2011

MEMORANDUM

SUBJECT: Protecting Water Quality with Green Infrastructure in EPA Water Permitting and Enforcement Programs

FROM: Nancy Stoner
Acting Assistant Administrator
Office of Water (OW)

Cynthia Giles
Assistant Administrator
Office of Enforcement and Compliance Assurance (OECA)

TO: EPA Regional Administrators, OW & OECA Office & Division Directors

The United States Environmental Protection Agency (EPA) strongly encourages and supports the use of green infrastructure approaches to manage wet weather through infiltration, evapotranspiration, and rainwater harvesting. As stated in previous memoranda,[1] EPA recognizes that green infrastructure can be a cost-effective, flexible, and environmentally-sound approach to reduce stormwater runoff and sewer overflows and to meet Clean Water Act (CWA) requirements. Green infrastructure also provides a variety of community benefits including economic savings, green jobs, neighborhood enhancements and sustainable communities. The benefits of green infrastructure are particularly enhanced in urban and suburban areas where green space is limited and environmental damage may be more extensive. The Office of Water (OW) and the Office of Enforcement and Compliance Assurance (OECA) are committed to working with interested communities and water resource managers to successfully incorporate green infrastructure into National Pollutant Discharge Elimination System (NPDES) permits, as well as remedies designed to address non-compliance with the CWA, to better manage both stormwater runoff and sewer overflows.

Given the multiple benefits associated with green infrastructure, EPA encourages the use of green approaches to stormwater runoff and sewer overflow management to the maximum extent possible. Green practices reduce stormwater runoff, preventing it from entering combined and separate sanitary sewer systems and reducing the volume and occurrence of overflows.

[1] "Using Green Infrastructure to Protect Water Quality in Stormwater, CSO, Nonpoint Source and other Water Programs" signed by Benjamin Grumbles, Assistant Administrator, Office of Water, on March 5, 2007, and "Use of Green Infrastructure in NPDES Permits and Enforcement" signed by Linda Boornazian, Director, Water Permits Division and Mark Pollins, Director, Water Enforcement Division, on August 16, 2007.

Green practices also lower the amount of untreated stormwater discharging to surface waters. Green infrastructure provides additional green spaces and recreational opportunities, enhanced ecosystem services, improved air quality, increased property values, energy savings, economic development, reduced urban heat island effects, and job creation opportunities. In addition, green infrastructure can serve as both a climate change mitigation and adaptation strategy, through increased carbon sequestration from plants and soils, and flexibility in adjusting to potential changes in precipitation patterns. As a result of these benefits, communities around the country are increasingly incorporating green designs into wet weather controls through both NPDES permits and water enforcement agreements.

Tremendous progress has been made in recent years on models and technical approaches to assist communities with green infrastructure planning, making it easier for communities to demonstrate that green infrastructure solutions meet CWA requirements. CWA NPDES permits and enforcement agreements that incorporate green or gray infrastructure solutions require enforceable performance criteria, implementation schedules, monitoring plans and protocols, progress tracking and reporting, and operation and maintenance requirements. Regardless of the technology used, EPA looks for a demonstration of sound modeling and technical approaches as well as planning for overall wet weather control approaches to satisfy regulatory requirements. EPA will continue to increase its efforts to help interested communities ensure that green infrastructure meets CWA requirements as well as community goals and encourages communities to consider green infrastructure in all wet weather control plans.

In November 2010, EPA Deputy Administrator Bob Perciasepe formed a cross-agency green infrastructure Steering Committee and Work Group comprised of representatives of each region and every Assistant Administrator's office to further encourage and support the implementation of green infrastructure solutions. As part of this effort, EPA will continue to work with other federal agencies, state and local governments, tribes, municipalities, and the private sector to identify opportunities and provide technical assistance to communities implementing green approaches to control wet weather. EPA will also provide additional tools to encourage states and communities to leverage green infrastructure opportunities within other innovative environmental projects.

We encourage you and your staff to contact OW's Green Infrastructure Coordinator, Chris Kloss at kloss.christopher@epa.gov and OECA's Green Infrastructure Coordinator, Mahri Monson at monson.mahri@epa.gov with questions, comments and information on green infrastructure in permitting and enforcement. Attachment A to this memorandum contains some recent examples of successful incorporation of green infrastructure into NPDES permits and enforcement actions. Attachment B lists the green infrastructure regional liaisons for both the water and the enforcement programs.

Cc: Regional Permit and Enforcement Liaisons

Attachments

Attachment A

Recent Examples of Green Infrastructure in Permits and Enforcement Actions

Stormwater Permitting Approaches with Green Infrastructure

California - Since May 2009, California Regional Water Quality Control Boards have adopted nine Phase I MS4 permits requiring that new development and redevelopment projects retain the 85th percentile storm event via infiltration, evapotranspiration, and rainwater harvest and reuse by utilizing green infrastructure practices. Within the individual permits, there are provisions that allow for off-site mitigation or payment of fees if retention and biofiltration are not technically feasible on site.

Charles River Watershed, MA - The draft Residual Designated Discharge General Permit has been developed and noticed for the communities of Milford, Bellingham and Franklin, Massachusetts. The draft permit proposes stormwater control requirements to reduce phosphorus loading for properties with two or more acres of impervious area and the use of infiltration/recharge practices to achieve the required phosphorus load reduction for a property if it is determined that such practices are technically feasible.

Massachusetts - EPA's draft small MS4 general permit for Massachusetts encourages the use of practices which capture (infiltrate, evapotranspire, and/or harvest and reuse rainwater) the 90th percentile storm event (1 inch storm). The draft permit also requires municipalities to examine existing guidelines and policies for their ability to support green infrastructure options in new development and redevelopment, identify impediments, and determine what changes need to be made.

Santa Monica, CA - In July 2010, the City updated its Urban Runoff Pollution Ordinance to require that new development and redevelopment projects infiltrate, store for non-potable use, or evapotranspire the first ¾ inch of a storm, or pay an Urban Runoff Reduction fee that the City then uses for larger scale stormwater control projects. The ordinance promotes the use of green infrastructure for meeting the stormwater retention requirements.

Washington, DC - The District's draft MS4 permit includes a development retention standard of 1.2 and 1.7 inches for non-federal and federal properties, respectively, along with numeric targets for green roofs (350,000 square feet over the permit cycle on District properties) and tree canopy (4,150 trees per year and 13,500 by 2014). The draft DC MS4 permit built off of a supplement to the previous permit that identified numeric targets for tree canopy, LID projects (17 by August 2009), rain gardens (50 by December 2009), rain barrels (125 by December 2009), and downspout disconnection (200 by December 2009).

Enforcement Actions with Green Infrastructure

Cincinnati, OH - Cincinnati's 2004 consent decree (CD) to control sewer overflows was amended in 2010, providing opportunities to incorporate green infrastructure solutions by

substituting "green for grey" on a project by project basis. The city is currently evaluating potential green infrastructure projects and has a three year study and detailed design period to examine green solutions in the Lick Run Watershed, in Mill Creek Valley on the west side of Cincinnati. One promising project in the Lick Run drainage area, a corridor that includes an environmental justice community, would remove storm water flows from the combined sewer system and create a new above-ground drainage feature with surrounding park land. Cincinnati will be meeting with EPA throughout 2011 to discuss green infrastructure plans, and proposals for "green for grey" substitutions are likely to be submitted in 2012.

Cleveland, OH - The 2010 Cleveland, OH, CD requires that green infrastructure be used to capture 44 million gallons of combined sewer overflow discharge in order to clean up Cleveland's waters. The city agreed to spend at least $42 million on green infrastructure and will conduct a feasibility study to develop a green infrastructure plan to meet the 44 million gallon reduction requirement. The agreement allows Cleveland to submit plans for additional green infrastructure controls, based on the results of initial projects. The city will target the majority of its green infrastructure projects in low-income and minority concentrated neighborhoods, where there is an abundance of vacant land that can be utilized at a relatively low cost. The residents of Cleveland will benefit from reduction of sewer overflows and their associated health hazards, increased green space and recreational opportunities, increased property values and job opportunities.

Kansas City, MO - EPA and Kansas City, Missouri signed a consent decree in May 2010 which requires the city to use green infrastructure to help control and eliminate sewer overflows. Kansas City will initially implement a green infrastructure plan to control wet weather flows in a 744-acre environmental justice neighborhood, with the option to expand green infrastructure programs throughout the city to help keep sewer overflows from polluting the community's water. Green infrastructure technologies to be implemented include catch basin retrofits in road and street rights-of-way, curb extension swales, street trees, permeable pavement, green roofs and stormwater planters. Thanks to this agreement, the citizens of Kansas City will benefit from improvements in water quality, air quality, and new green spaces throughout the city.

Louisville, KY - Through an agreement with EPA filed in 2005 and amended in 2009, Louisville, Kentucky is using green infrastructure to help solve the city's sewer overflow problems. Louisville has committed to constructing 19 initial green infrastructure demonstration projects including green roofs, green streets, urban reforestation, and other green elements to keep polluted runoff from entering their waters. After a six-year study period to monitor demonstration projects, the sewer department may propose additional green infrastructure controls. Louisville's sewer department has already distributed hundreds of rain barrels to residents throughout the city, providing citizens the opportunity to participate in cleaning up their waters. The community at large will continue to benefit from ongoing installment of rain gardens, permeable parking lots, and other green amenities throughout Louisville.

Attachment B

Regional Green Infrastructure Liaisons

Region	Water Program Green Infrastructure Liaisons	Enforcement and Compliance Green Infrastructure Liaisons
1	Johanna Hunter	Joy Hilton Jeff Kopf
2	Jeff Gratz	Murray Lantner
3	Dominique Lueckenhoff	Allison Graham
4	MaryAnn Gerber Darryl Williams	Araceli Bonilla
5	Bob Newport	Jonathan Moody
6	Brent Larsen Suzanna Perea	Diana McDonald
7	Kerry Herndon Mandy Whitsitt	Jodi Bruno
8	Stacey Eriksen	David Gwisdalla
9	John Kemmerer	Michelle Moustakas
10	Krista Mendelman	Rob Grandinetti

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 27 2011

MEMORANDUM

SUBJECT: Achieving Water Quality Through Integrated Municipal Stormwater and Wastewater Plans

FROM: Nancy Stoner
Acting Assistant Administrator
Office of Water (OW)

Cynthia Giles
Assistant Administrator
Office of Enforcement and Compliance Assurance (OECA)

TO: EPA Regional Administrators, OW & OECA Office & Division Directors

One of the most basic objectives of the Clean Water Act (CWA) is to keep raw sewage and pollutants carried by stormwater out of our nation's waters. We have made tremendous strides towards achieving that objective, but much work remains to be done. As we move forward with our work, we must be mindful that many of our state and local government partners find themselves facing difficult financial conditions. Their ability to finance improvements by raising revenues or issuing bonds has been significantly impacted during the ongoing economic recovery. We write this memorandum to make sure that we proceed as one EPA to assure that we work with states and communities to get the most effective as well as cost-effective approaches for meeting our shared objective of clean water that protects public health and the environment.

Integrated Planning for Cost-Effective Solutions

Today, the EPA, states and municipalities often focus on each CWA requirement individually for protecting water quality. As a result, we sometimes assess and implement the best alternative to solve one problem at a time without full consideration of all CWA obligations. This approach may have the unintended consequence of constraining a municipality from implementing the most cost-effective solutions in a sequence that addresses the most serious water quality issues first. We encourage regions to work with the states to engage our local partners regarding all of their National Pollutant Discharge Elimination System (NPDES) related obligations in an orderly manner. A comprehensive and integrated planning approach to a municipal government's CWA waste- and storm-water obligations offers the greatest opportunity for identifying cost-effective and protective solutions and implementing the most important projects first. The CWA and its implementing regulations, policy and guidance provide us

with the necessary flexibility to work with communities to utilize comprehensive integrated planning to prioritize its waste- and storm-water investments.

Integrated planning will put municipalities on a critical path to achieving the water quality objectives of the CWA by identifying efficiencies in implementing sometimes overlapping and competing requirements that arise from separate waste- and storm-water programs, including how best to make capital investments and meet operation and maintenance requirements. Integrated planning also can lead to the identification of sustainable and comprehensive solutions, such as green infrastructure, that improve water quality as well as support other quality of life attributes that enhance the vitality of communities.

In embracing an integrated approach to waste- and storm-water management we are not suggesting that existing regulatory or permitting standards that protect public health and water on which communities depend be lowered. Rather, we are simply suggesting that such an approach will help municipalities responsibly meet their CWA obligations by maximizing their infrastructure improvement dollars through the appropriate sequencing of work. This will require coordination between permit and enforcement actions and complementary state actions. In so doing, as we consider a particular municipality's financial ability to complete the required infrastructure improvement work we must be sure that we consider all of its CWA obligations. EPA's existing regulations and policies provide EPA and states flexibility to evaluate a municipality's financial capability in tough economic times and to set appropriate compliance schedules, allow for implementing innovative solutions and sequence critical waste- and storm-water capital projects and operation and maintenance related work in a way that ensures human health and environmental protection. We recognize that such an integrated approach will necessarily involve balancing all of a municipality's competing CWA priorities with the public health and welfare objectives of the CWA. In doing so, we must be diligent in ensuring that a municipality be positioned to address its most pressing public health and welfare issues first.

States and local governments share our commitment to protecting public health and welfare. As an initial step towards meeting this shared commitment, the Office of Water and Office of Enforcement and Compliance Assurance are developing an integrated planning approach framework to help EPA, including its regional offices, work with state and local governments toward cost effective decisions. The framework will identify: 1) the essential components of an integrated plan; 2) steps for identifying municipalities that might make best use of such an approach; and 3) how best to implement the plans with our state partners under the CWA permit and enforcement programs.

Once the framework is in draft form we want to begin discussions and hold meetings with states and local governments, utilities and environmental groups to obtain their feedback on the draft framework in the coming months. In addition, we hope to identify municipal leaders who are currently developing, or have developed, integrated plans that can serve as models for this work.

Green Infrastructure

As you know, given the multiple benefits associated with green infrastructure, EPA strongly encourages the use of green infrastructure and related innovative technologies, approaches, and practices to manage stormwater as a resource, reduce sewer overflows, enhance environmental quality, and achieve other economic and community benefits. Many cities and communities in the United States are now

employing green infrastructure practices and know the value of such projects to not only protect water resources, but also to bring opportunities for greenways and multiuse recreational areas, improving property values, saving energy and creating green jobs.

In April of this year, we released our new green infrastructure strategic agenda, which outlines the activities that we will undertake to help communities implement green infrastructure approaches. Our strategy aims to clarify and advance the wider utility of green infrastructure within the regulatory and enforcement contexts through improvements in outreach and information exchange, financing, and tool development and capacity building.

Over the past several years, we have been working closely with state and local governments to incorporate green infrastructure approaches to water quality within permits and enforcement actions. We have many successful examples of cities who will utilize green infrastructure to meet regulatory requirements while also benefiting from green jobs, neighborhood enhancements and more sustainable communities. We have also launched a community partnership program that has currently identified 10 communities with which the Agency will work on green infrastructure implementation issues. The Agency hopes to add up to an additional 20 communities in the future. We have also started to develop technical assistance resources for some of these communities on using green infrastructure on brownfield sites and slowly infiltrating soils and evaluating codes and ordinances for barriers. All of these green infrastructure and associate innovations are important tools that will be fundamental aspects of the integrated waste- and storm-water planning solutions we envision.

We have the tools in our existing regulations and guidance to find answers to these problems. The current economic times make the need for sensible and effective approaches even more pressing. We have already seen the benefits that leadership and creativity in the regions' work bring to resolving these issues, reflected in forward looking plans in Indianapolis, Cleveland, St. Louis and many others. We look forward to working with you, and with states and local communities, to continue to pursue innovative and cost effective solutions to our water quality challenges.

We encourage you and your staff to contact Deborah Nagle, Director, Water Permits Division (nagle.deborah@epa.gov) and Mark Pollins, Director, Water Enforcement Division (pollins.mark@epa.gov) with any questions you might have.

Cc: Regional Permit and Enforcement Liaisons

Public Notice – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of overflows from a combined sewer system during wet weather events into three water bodies in Alexandria, Virginia.

PUBLIC COMMENT PERIOD: July 12, 2013 to August 12, 2013

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – issued by DEQ, under the authority of the State Water Control Board.

APPLICANT NAME, ADDRESS AND PERMIT NUMBER: City of Alexandria
301 King Street, Room 4100, Alexandria, VA 22313
VA0087068

NAME AND ADDRESS OF FACILITY: Alexandria Combined Sewer System
Alexandria, VA 22313

PROJECT DESCRIPTION: The City of Alexandria has applied for reissuance of a permit for the public Alexandria Combined Sewer System. The applicant proposes to release combined sewer system overflows during wet weather events at an estimated annual volume of 112.8 million gallons into three water bodies. There is no sludge generated by this system. The facility proposes to release combined sewer system overflows during wet weather events in the Hooffs Run, Hunting Creek and Oronoco Bay in Alexandria in the Potomac River watershed. A watershed is the land area drained by a river and its incoming streams. The permit requires monitoring of the following pollutants: pH, carbonaceous-Biochemical Oxygen Demand, Total Suspended Solids, Dissolved Oxygen, Total Kjeldahl Nitrogen, Ammonia, E. coli, Nitrate+Nitrite, Total Nitrogen, Total Phosphorus, Chlorides, Total Recoverable Zinc, and Total Recoverable Copper.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by email, fax or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS AND ADDITIONAL INFORMATION: The public may review the documents at the DEQ-Northern Regional Office by appointment or may request electronic copies of the draft permit and fact sheet.

Name: Douglas Frasier
Address: DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193
Phone: (703) 583-3873 Email: Douglas.Frasier@deq.virginia.gov Fax: (703) 583-3821

Attachment 18
City of Alexandria Combined Sewer System
VA0087068

Draft Permit Response to Comments Document

Introduction

This document serves as the Northern Regional Office's response to comments received during the public comment period associated with the draft permit. A list of commenters, their method of submission, the date comment letters were received by the regional office and staff responses pertaining to those submissions are provided on pages 4 through 10.

The format of this comment response document, found on pages 4 through 10, presents the actual comment as it was submitted to DEQ followed by staff's response. Similar comments, or those addressing similar comments, were consolidated for staff response.

During the draft permit public comment period, the Northern Regional Office received comments from the Friends of Dyke Marsh via Glenda Booth, President and Potomac Riverkeepers via Robin Broder, Vice President. Neither organization requested a public hearing; rather, looking forward to working with the City during the development of the Long Term Control Plan Update.

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List of Commenters

Letters Submitted During Public Comment Period 12 July 2013 – 12 August 2013			
Commenter	**Mode of Submittal**	**Date Received**	**Staff Comments**
Friends of Dyke Marsh via Glenda Booth, President	Email	12 August 2013	
Potomac Riverkeeper Via Robin Broder, Vice President	Email	12 August 2013	

Public Comment #1:

a. Our overriding comment is that it is simply unacceptable to allow any amount of untreated sewage to enter the waterways from the city of Alexandria or any source in the 21st century. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain plans that would lead to eliminating the discharge of untreated sewage.

b. Potomac Riverkeeper's believes that it is unacceptable to allow any amount of untreated sewage to enter the waterways from the City of Alexandria's CSS or any other source. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain the goal of eliminating entirely the introduction of untreated sewage.

Staff Response:

These legacy systems, installed in the mid to late 1800's, are found in many areas of the United States. Each system presents its own challenges and complexities as localities continue to address the impacts. This draft permit reflects the CSO Control Policy; allowing the City to explore value-engineered solutions to comply with applicable water quality standards. Staff anticipates that a complimentary approach involving gray and green engineering projects will be embarked to (1) satisfy the reductions necessary under the Hunting Creek Bacteria TMDL, (2) improve overall water quality and (3) minimize downstream impacts. Please refer to Section 21.d of the Fact Sheet for a more detailed explanation.

Public Comment #2:

a. The permit and fact sheet contain little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health. While perhaps beyond the scope of normal permitting practices, we believe that downstream impacts on water quality and natural resources are quite serious, adverse and should be evaluated.

b. The permit application contains little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health. While the focus of the permit is on Hunting Creek Bacteria TMDL compliance, we believe that downstream impacts are quite serious and adverse on sensitive areas such as Dyke Marsh and should be evaluated, particularly the control of solid and floatable materials.

Staff Response:

One of the procedures staff completes while drafting a discharge permit is to evaluate and determine if a reasonable potential exists that the discharge(s) could impact the receiving stream based on the characteristics of the discharge. This exercise takes into account not only the immediate receiving stream but also possible downstream impacts. Attachment 14 of the Fact Sheet illustrates this analysis and Section 15 of the Fact Sheet notes any downstream impairments that may exist which are taken into account during development of the permit.

Please see Comment #5 and subsequent staff response regarding solid and floatable materials.

Public Comment #3:

a. Section E.4 of the draft permit requires the city to develop and complete implementation of the Long Term Control Plan Update for the Hunting Creek Bacterial TMDL "as soon as practicable" but no later than Dec. 31, 2035," 32 years from now. The city's first LTCP was approved by DEQ in February 1999.

   The Friends of Dyke Marsh believe that taking 32 years to eliminate combined sewer overflows is far too long. A more aggressive schedule is needed, given the frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows, as discussed in comment 6 below. In addition, many studies show that as the climate warms, intense weather events like severe storms and hurricanes, will become more numerous and more frequent, further burdening the sewer system and exacerbating overflows.

b. We are encouraged that the City of Alexandria will be developing an updated LTCP to achieve compliance with the Hunting Creek Bacteria TMDL within three years of issuance of the permit and will allow for public participation during its development. We support the City's plan to include target for Outfall 001 even though it does not fall within the TMDL, and we urge the City to aim for a 99% reduction target. We also urge the City to review the 80% reduction target for Outfall 002 and instead have a target of 99%, the same as Outfalls 003 and 004.

We request that the City reduce the "no later' date for compliance of December 31, 2035. An expedited schedule is needed, given the increased frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows. In addition, many studies demonstrate that as the climate becomes warmer, intense weather events such as severe rain and snow storms and hurricanes will become more frequent, further burdening stormwater and sewer systems.

Staff Response:

The regulatory approach incorporated into the draft permit includes both near and long term requirements, each with associated goals and outcomes. DEQ supports this path forward as it both achieves short term results, while also ultimately ensuring compliance with water quality standards. Once finalized, the LTCPU will be required to be fully implemented in less than 20 years, not 32 years as noted above, in order to meet the 2035 compliance date.

Please refer to the Fact Sheet, Page 12, Section 21.d for details on the LTCPU. It is staff's best professional judgement that this time frame is justified given the system's complexities. This is a highly developed, densely populated area presenting challenges that other systems across the nation face with legacy combined sewer systems. Integrated gray and green engineering projects require extensive engineering evaluation, planning and implementation, even for this relatively small system. CSO Control Policy, Section II.C.5 does allow for appropriate cost/performance considerations to help guide the selection of controls.

This general regulatory approach to incorporate green infrastructure and integrate stormwater and wastewater controls is consistent with the approaches encouraged by EPA in memorandum's published in 2011 (see Fact Sheet Attachments 15 & 16).

DEQ staff will forward your comments to the City regarding an expeditious compliance schedule for their consideration.

Public Comment #4:

a. Section E.8.b of the draft permit says the "permittee shall study, implement and promote green infrastructure projects..."

While the city may need to identify appropriate sites, the Friends of Dyke Marsh believe further study of "green infrastructure' or low-impact development approaches is unnecessary and will delay implementation. Green infrastructure is becoming more common and many examples exist across the U.S. that the city of Alexandria should adopt and implement, including Fairfax County, the District of Columbia, Chicago and Portland, Oregon.

b. While implementation of green infrastructure or low-impact development should be required to decrease stormwater discharges, it is not a substitute for measures that eliminate sewer overflows. As presented in the CSS Permit Fact Sheet (p.2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events in 2011 discharged nearly 113 million gallons into Hunting Creek and the Potomac. Since the minimum rainfall for an overflow event is quite low, the priority should be on disconnecting the sewer system from the CSS. In addition, we support the City's plan to implement improvements at Outfalls 003 and 004 on or before 30 months of the permit effective date.

The permit applications states that the "permittee shall study, implement and promote green infrastructure within the CSS watershed." We would like clarification on what is to be included in the "study."

We believe that the effectiveness of green infrastructure and low-impact development is well studied and documented and the focus should be on development and implementation.

c. We support the green initiatives and other mitigation approaches that we hope will reduce the amount of water flowing into the storm sewers. We note, however, that very little rainfall or snow melt is required to trigger an overflow event. As presented in the CCS Permit Fact Sheet (p. 2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events were expected during 2011, apparently according models, that put nearly 113 million gallons of overflow into Hunting Creek and the Potomac.

At an August 5 meeting of the Alexandria Environmental Policy Commission, Mr. William J. Skrabak, Deputy Director of the city's Office of Environmental Quality, was clear, that, in his words, "most rainfall events" cause overflow. He said that "the system cannot carry anything more than a slight drizzle."

It seems unlikely that the mitigation measures listed in the current draft permit will have a significant impact in reducing overflows.

Staff Response:

As stated in the Fact Sheet, Section 10, combined sewer overflows are the result of wet weather events. This permit term requires the City to evaluate and implement green infrastructure projects to reduce the amount of stormwater entering the sewer system; thus, reducing the total volume of overflows. In addition, installation of these controls will have benefits outside the scope of this permit. These controls will be applied and evaluated throughout the sewershed at City facilities and other areas as appropriate.

Green infrastructure, while becoming common in other areas of the nation, requires careful and diligent engineering and planning. Factors such as climate, soils, location and maintenance determine the types of systems that may be utilized to obtain optimal performance.

Public Comment #5:

Section D.6 of the draft permit states that "the permittee shall continue to implement measures to control solid and floatable materials in the CSS," including "consideration" of entrapment and baffling devices to reduce discharges of solids and floatable materials.

The Friends of Dyke Marsh believe that "consideration" is too weak a requirement. Floatable materials -- cans, bottles, plastics, cigarette butts, trash of all kinds and other debris – are widespread and common in the wetland and in Hunting Creek, clearly evident in a low-tide visit to the Hunting Creek Bridge on the George Washington Parkway or any visit to Dyke Marsh or the Potomac River shoreline in Fairfax County. The mudflats on both the creek and Potomac sides of the bridge, prominent feeding areas for shorebirds, egrets, herons, turtles and other species, are littered with debris.

Twice a day the tide washes up debris into Dyke Marsh and debris flows from Washington, D.C., Alexandria and boaters into Dyke Marsh. Among other concerns, we know that small animals can become trapped in cans and bottles. Fish, birds and other animals mistake cigarette butts for food. Plastic items rarely biodegrade. Animals mistake plastic and Styrofoam debris, especially small pieces, for food. Birds become entangled in six-pack rings. Animals can suffocate or choke when caught in plastic bags.

Trash from the Potomac can enter the Chesapeake Bay and the Atlantic Ocean, endangering freshwater and marine wildlife that may ingest or become entangled in the debris, resulting in injury or death.

The Alice B. Ferguson Foundation, which organizes annual cleanups in the Potomac watershed, collected 312 tons of trash to date in 2013. While Alexandria constitutes a small portion of the watershed, the city's contribution seems to be concentrated in Hunting Creek and comes mainly from storm sewers. Members of the Friends of Dyke Marsh members engage in cleanups and report Hunting Creek as a rich source of debris of all kinds.

Staff Response:

The referenced permit language is found in EPA guidance documents for Combined Sewer Overflows and is consistent with the CSO Control Policy which is the national framework for these types of systems. As noted during the 5 August 2013 public meeting and in the Draft permit, the City is required to conduct regularly, scheduled street cleaning within the CSS sewershed. The rotation and frequency of cleaning have been determined by the amount of trash noted during past cleanings. Documentation is submitted with each annual report.

Public Comment #6:

Section D.8.a requires that "identification signs at all CSS outfalls are maintained and easily readable by the public."

While signs are currently posted, the wording on these signs is somewhat misleading. The wording is, in part, "Combined stormwater and sanitary sewage may be discharged at this location during and after heavy or long rain events." According to data on the minimum rainfall needed to cause an overflow event (see comment 6 below), the terms "heavy" and "long" are misleading because according to the Fact Sheet, rainfall from 0.03 to 0.21 inches could lead to overflows. The current signs may lead citizens to misunderstand the likelihood of an overflow.

In addition, some of the signs are not easily readable by the public:

- The signs should stand at eye level. Two signs are too high to be easily read or even noticed by the public: the sign at Outfall 001 (Oronoco Bay) is eight feet four inches high (measured from boardwalk level to top of sign) and the sign for Outfalls 003/004 on the walkway along Holland Lane is nine feet two inches high (measured from ground to top of sign). Besides being too high, the Holland Lane sign is parallel rather than perpendicular to the path and thus not noticeable to walkers.

- The sign for Outfalls 003/004 along the path between Jamieson Avenue and Duke Street is barely visible through the vegetation inside the pathway railing. While we believe signs should be visible to the public, we hope you will try to preserve native plants in the area, like milkweed, the host plant for several butterfly species that are declining.

There is no sign on the east side of Hooff's Run in the area where the Run is accessible.

We also hope you will consider making the signs bilingual, in English and Spanish, given the area's growing Hispanic population.

Staff Response:

Please refer to the Draft permit, Part I.E.5.c.; during this permit term, the City is required to install universal signage, approved by DEQ-NRO staff, by 31 December 2013 at each of the outfalls.

DEQ staff will forward comments concerning the height/visibility of the signs to the City for their consideration.

Public Comment #7:

Overflow event data are presented in the CCS Permit Fact Sheet (p. 4, Table 1). These data are out of date. The table notes that these data are either "Approximations; per permit application, dated 8 July 2011, for the time period of June 2010 – May 2011, or 2011 Annual Report Model Summary data." Given the monitoring described in the permit, more recent and some observation-based data should be provided, especially for the number of overflow events.

Staff Response:

Staff utilized the most current data available at the beginning of this process. This reissuance has been delayed for one year as proposed permit conditions and requirements were discussed and finalized. It is staff's best professional judgement that the model summaries utilized in the Fact Sheet are still representative of the system.

Public Comment #8:

Information on progress in achieving the Hunting Creek TMDL is difficult for the public to access online. For example, the 2011 Combined Sewer System Annual Report for 2011 contains appendices showing sampling results for Hunting Creek and Oronoco Bay. These data are point-in-time data and do not indicate trends over time. The CSS Permit Fact Sheet may contain this information in appendices, but pages 46 through the end are illegible.

The annual report required in Section E.5.a of the draft permit should contain information on trends in bacterial levels and other measures, and progress toward meeting the TMDL in language that the average person can understand. Trend data is critical in knowing how and whether water quality is improving or not.

Staff Response:

The implementation plan for the Hunting Creek Bacteria TMDL has not been developed; therefore, there is no trend data to measure progress. The City's combined sewer system is only one of many components included in the TMDL. For this reason, staff does not feel that the City should monitor and report bacteria trends in Hunting Creek. The focus of this discharge permit concerns the combined sewer system and its progress towards complying with the assigned bacteria wasteload allocations.

Water quality data for Hunting Creek, including bacteria data, are collected by DEQ at the George Washington Memorial Parkway bridge. These data are evaluated periodically as published in the biennial Integrated Report and are available from DEQ upon request.

Public Comment #9:

Section E.5.a of the draft permit requires the city to "publish the annual reports on the City's website and retain the reports on the website for a period of no less than two years."

Currently, we are unable to find an annual report on the city's website. The 2011 report, the 17th such report, is posted on the VDEQ website, although it is somewhat difficult to locate. According to August 2013, email communications with a city official, the 2012 annual report was completed in March 2013, but is not currently available on the city's website. A hard copy of the report can be viewed by appointment, thus making access cumbersome and limited.

The permit should require that annual reports be posted on the city of Alexandria website as soon as they are completed and be retained on the site a longer period. At a minimum, the three most recent reports should be retained on the site.

Staff Response:

This Draft permit contains the first requirement in which the City will post the annual reports for public access (Part I.E.5). Previous permit terms did not include this requirement; thus, the City is not required by DEQ to post previous annual reports on their website. The first annual report that is required to be posted on the website is for calendar year 2013.

It is staff's best professional judgement that the reports be uploaded to the City's website after DEQ review and comment and that the retention requirement of two years is sufficient.

Public Comment #10:

The Fact Sheet (p. 7) provides information on threatened or endangered species that are in the vicinity of the discharges from the combined storm and sanitary sewers:

> "The following threatened and endangered species were identified within a 2 mile radius of the outfalls: Brook Floater (mussel); Grizzled Skipper (butterfly); Bald Eagle; and Migrant Loggerhead Shrike (song bird)."

This information does not appear to be accurate or current. We urge DEQ to use accurate and more current data. Also, we recommend that scientific names also be included in the description of threatened and endangered species, as common names are variable.

Concerning the loggerhead shrike, the Virginia Society of Ornithology has documented a precipitous decline of this species. No loggerhead shrike has been reported in Alexandria or in Dyke Marsh for at least 50 years, according to experienced bird watchers in the area.

The bald eagle is no longer listed as a federally-endangered species, having been removed from the list by the U.S. Fish and Wildlife Service in 2007. However, the bald eagle remains protected by federal law. Dyke Marsh and the Potomac corridor south of Alexandria are home to bald eagles, which are often seen feeding on fish from the Potomac or perched along the shoreline.

The Virginia Department of Game and Inland Fisheries lists the peregrine falcon as a state-threatened species. The peregrine falcon has been reported within two miles of Alexandria as recently as 2012 and has been observed during the weekly Dyke Marsh bird walks as recently as September 2012.

The grizzled skipper (Appalachian Grizzled Skipper, *Pyrgus centaureae wyandot*) was last observed in Northern Virginia prior to 1950.

According to information from National Park Service biologists, two mussel species on the 2010 Maryland Species of Concern list have been observed at Daingerfield Island, within the city of Alexandria: the tidewater mucket (*Leptodea ochracea*), and the eastern pond mussel (*Ligumia nasuta*). The brook floater (*Alasmidonta varicosa*), mentioned in the permit, is also on the Maryland list, but has not been observed in the Potomac area included in the Park Service data (Great Falls to Mount Vernon).

These are examples that indicate to us that more thorough and more accurate information is needed on the flora and fauna that are affected by current and future combined sewer overflows from Alexandria.

Staff Response:

DEQ staff utilizes an online database, maintained by the Virginia Department of Inland Fisheries and Game, to conduct queries concerning threatened and endangered species within 2 miles of the discharge point. This was specifically stated in Section 15.d. of the Fact Sheet. Staff cannot verify or deny the correctness of the data made available to the agency.

The database search, as explained previously, lists both federal and state listed endangered and threatened species. It should be noted that this database was accessed approximately two years ago (25 August 2011) and may have been updated since that time. At that time, the database still had the Bald Eagle listed as endangered by the state.

Staff will consider including the species' scientific name as suggested above.

Public Comment #11:

The development and implementation of the LTCP is occurring at the same time as implementation of plans and projects to address Alexandria's allocation of stormwater reduction under the city of Alexandria's MS4 Phase II permit. Because the goals are congruent and projects may benefit, progress on both the MS4 and the CSS requirements, plans for the two activities should be coordinated and should be communicated to the public as joint activities.

Staff Response:

During the City's public meeting, held on 5 August 2013, City officials acknowledge the need and ongoing effort to coordinate the requirements for both the combined sewer system and the MS4 permit since the two are interrelated. Even though the Draft permit is silent on any coordination with the current and future stormwater requirements, the intent is that both permits and their respective requirements will compliment.

DEQ staff will forward this comment to the City for their consideration as they are the permit holder.

Public Comment #12:

We support the City's goal of making the voluntary CSS Area Reduction program requirement under the permit. The City was well advised to make the Potomac Yard trunk line oversized in anticipation of new hook ups. We also support the City's Payne & Fayette Sewer Separation project. While the permit has a goal of reducing overflows by at least 5 million gallons over the course of the permit period, we strongly recommend that the City exceed this goal through expediting the separation of sewers in the CSS.

Staff Response:

DEQ staff will forward this comment to the City for their consideration as they are the permit holder.

Potomac RIVERKEEPER®

1100 15th Street, NW, 11th floor
Washington, DC 20005
202.222.0707
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www.potomacriverkeeper.org

August 12, 2013

Submitted via email

Douglas Frasier
DEQ-Northern Regional Office
13901 Crown Court
Woodbridge, VA 22193
Douglas.Frasier@deq.virginia.gov

Re: Comments on the city of Alexandria's Combined Sewer System (CSS) Permit Application (VA0087068)

Dear Mr. Frasier:

On behalf of Potomac Riverkeeper, Inc, I am submitting these comments on the City of Alexandria's Combined Sewer System draft permit application (Permit No. VA0087068).

Potomac Riverkeeper, a grassroots, nonprofit organization founded in 2000, includes the Potomac Riverkeeper and the Shenandoah Riverkeeper. Potomac Riverkeeper's mission is to stop pollution and restore clean water in the Potomac and Shenandoah Rivers and their tributaries. Its primary strategy is enforcement of the Clean Water Act and other environmental laws on behalf of its membership. Potomac Riverkeeper has over 2700 members throughout the four states and the District Columbia that comprise the almost 15,000 square mile Potomac watershed. It has offices in DC, Maryland, Virginia and West Virginia.

Overview

The City of Alexandria issued its first permit regulating the Combined Sewer System (CSS) in 1995, followed by the adoption of its Long Term Control Plan (LTCP) in 1999. The LTCP consists of nine minimum technology-based requirements (included again in the draft permit application). As city staff stated at the August 5, 2013 public meeting, the 2001 and 2007 permit renewals continued the status quo and focused on monitoring the CSS. Now, the City has issued a draft permit that for the first time outlines objectives and strategies to reduce discharges from the CSS. Primarily, the draft permit focuses on the Bacteria Total Minimum Daily Load (TMDL) for Hunting Creek, with the recognition that "further reductions in CSOs are needed. . . to comply with the loadings specified in the recent Hunting Creek Bacteria TMDL."

The Potomac River is one of the nation's jewels. It flows through four states (Virginia, West Virginia, Maryland and Pennsylvania) and the District of Columbia, and it is a source of drinking water for over five million residents. Each day, however, the Potomac River and its tributaries suffer thousands of assaults. Pollutants like fecal coliform, nitrogen, phosphorus, heavy metals, and pesticides coming from industrial, agricultural, urban, and other sources threaten and degrade its water quality. Stormwater runoff in urban and suburban areas has been the fastest growing source of pollution over the past 20 years due to an increase in impervious surfaces that has outpaced the increase in population. Once-abundant fish populations are diseased, dying, and in some cases even changing sexes. Algae blooms in nutrient-rich waters die, decay and cause oxygen deprived dead zones. Some algae blooms are toxic to aquatic animals and humans. Forty years after the passage of the Clean Water Act, we are now seeing the adoption and implementation of regulations and permits such as the Hunting Creek Bacteria TMDL and the implementation of Long Term Control Plans for Combined Sewer Systems that will finally address the pollution from thousands of sources throughout the Potomac watershed.

Comments

1. Elimination of untreated sewage to local waterways and the Potomac River.

Potomac Riverkeeper's believes that it is unacceptable to allow any amount of untreated sewage to enter the waterways from the City of Alexandria's CSS or any other source. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain the goal of eliminating entirely the introduction of untreated sewage.

2. Consideration of downstream impacts.

The permit application contains little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health. While the focus of the permit is on Hunting Creek Bacteria TMDL compliance, we believe that downstream impacts are quite serious and adverse on sensitive areas such as Dyke Marsh and should be evaluated, particularly the control of solid and floatable materials.

3. More stringent reduction targets and earlier compliance date for updated LTCP.

We are encouraged that the City of Alexandria will be developing an updated LTCP to achieve compliance with the Hunting Creek Bacteria TMDL within three years of issuance of the permit and will allow for public participation during its development. We support the City's plan to include targets for Outfall 001 even though it does not fall within the TMDL, and we urge the City to aim for a 99% reduction target. We also urge the City to review the 80% reduction target for Outfall 002 and instead have a target of 99%, the same as Outfalls 003 and 004.

We request that the City reduce the "no later" date for compliance of December 31, 2035. An expedited schedule is needed, given the increased frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows. In addition, many studies demonstrate that as the climate becomes warmer, intense weather events such as severe rain and snow storms and hurricanes will become more frequent, further burdening stormwater and sewer systems.

4. Green infrastructure not a substitute for eliminating sewer overflows.

While implementation of green infrastructure or low-impact development should be required to decrease stormwater discharges, it is not a substitute for measures that eliminate sewer overflows. As presented in the CCS Permit Fact Sheet (p. 2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events in 2011 discharged nearly 113 million gallons into Hunting Creek and the Potomac. Since the minimum rainfall for an overflow event is quite low, the priority should be on disconnecting the sewer system from the CSS. In addition, we support the City's plan to implement improvements at Outfalls 003 and 004 on or before 30 months of the permit effective date.

The permit application states that the "permittee shall study, implement and promote green infrastructure within the CSS watershed." We would like clarification on what is to be included in the "study." We believe that the effectiveness of green infrastructure and low-impact development is well studied and documented and that the focus should be on development and implementation.

5. City should exceed its goal of reducing overflows by at least 5 million gallons over the course of the permit period.

We support the City's goal of making the voluntary CSS Area Reduction program a requirement under the permit. The City was well advised to make the Potomac Yard trunk line oversized in anticipation of new hook ups. We also support the City's Payne & Fayette Sewer Separation project. While the permit has a goal of reducing overflows by at least 5 million gallons over the course of the permit period, we strongly recommend that the City exceed this goal through expediting the separation of sewers in the CSS.

Thank you for this opportunity to comment on the City of Alexandria's CSS permit application. We look forward to working with the city to accelerate the reduction and eventual elimination of combined sewer overflows.

Sincerely,

Robin Broder

Robin Broder, Vice President
Potomac Riverkeeper, Inc.
1100 15th Street, NW, 11th floor
Washington, DC 20005
robin@potomacriverkeeper.org

Frasier, Douglas (DEQ)

From: Gbooth123@aol.com
Sent: Tuesday, August 13, 2013 1:07 PM
To: Frasier, Douglas (DEQ)
Subject: Alexandria permit

The statement we submitted yesterday on Alexandria's CSS permit application had a misstatement. Please substitute this paragraph for the one we submitted.

(In the one we submitted the number "10" followed the word "nation's".)

Thank you.
Glenda Booth
President
Friends of Dyke Marsh
703-765-5233

Please confirm that you received our comments and this addition. Thank you.

Unhealthy Waters

The Potomac River, a drinking water source for five million people, is not healthy. In 2012, American Rivers identified the Potomac "the nation's most endangered river." In December 2011, the Potomac Conservancy gave the river a D, down from a D+ in 2007 when the Conservancy last "graded" the waterway. In 2011, the grade for overall health of the Potomac River was dropped from a C to a D by EcoCheck in partnership with the National Oceanic and Atmospheric Administration and the University of Maryland's Center for Environmental Science. Four of six indicators declined.

Friends of Dyke Marsh Comments on the Alexandria Combined Sewer System Permit Application to the Virginia Water Control Board

August 12, 2013

To: Douglas.Frasier@deq.virginia.gov
DEQ-Northern Regional Office, 13901 Crown Court, Woodbridge, VA 22193

From: Glenda C. Booth, President, Friends of Dyke Marsh, www.fodm.org
P.O. Box 7183, Alexandria, VA 22307; telephone 703-765-5233

Subject: Friends of Dyke Marsh comments on the city of Alexandria's Combined Sewer System (CSS) Permit Application (VA0087068)
http://www.deq.virginia.gov/fileshare/wps/PERMIT/NRO/City%20of%20Alexandria%20CSS/

On behalf of the Friends of Dyke Marsh, I am submitting these comments on the city of Alexandria's Combined Sewer System draft permit application (Permit No. VA0087068).

The Friends of Dyke Marsh

The Friends of Dyke Marsh is a volunteer group dedicated to preserving, restoring and enhancing Dyke Marsh, a 480-acre freshwater tidal wetland in Fairfax County on the Potomac River just south of Alexandria, Virginia. The Dyke Marsh Wildlife Preserve is administered by the National Park Service. (http://www.nps.gov/gwmp/planyourvisit/dykemarsh.htm)

Inherent to the mission of the Friends of Dyke Marsh is support of efforts to assure that the Potomac River, Hunting Creek and other tributaries of the Potomac have the highest water quality possible and that water meets all state and federal clean water standards. The Alexandria CCS permit would allow release of combined sewer system overflows during wet weather events at an estimated annual volume of 112.8 million gallons into three water bodies immediately upstream from the Dyke Marsh Wildlife Preserve: Hooff's Run (tributary of Hunting Creek), Hunting Creek and Oronoco Bay of the Potomac River. Assuming 10 percent of this volume is from sanitary sewers,[1] 11.3 million gallons of untreated sewage would be dumped into waters that could flow into Dyke Marsh.

Importance of Dyke Marsh

Dyke Marsh is one of the most significant temperate, tidal, freshwater, riverine marshes *nationally* in the park system. About 500 years old, Dyke Marsh is a remnant of the wetlands that once lined the Potomac River. Congress added the Dyke Marsh Wildlife Preserve as a nature preserve to the National Park Service system in 1959 "so that fish and wildlife development and their preservation as

wetland wildlife habitat shall be paramount." It has 300 known species of plants, 6,000 arthropods, 38 fish, 16 reptiles, 14 amphibians and over 230 birds. The 2012 Breeding Bird Survey identified 48 confirmed or probable breeding species in Dyke Marsh.[2]

Thousands of birds – songbirds, shorebirds, waterfowl, wading birds, raptors -- as well as the aquatic life and fish on which they feed, use Hunting Creek and Hunting Creek embayment. Many waterfowl winter in these waters, and some are year-round residents. Many species of shorebirds use this area for rest and feeding during migration. Our surveys show that shorebirds have declined in abundance there in recent years.

Dyke Marsh supports the only known nesting population of marsh wrens in the upper Potomac tidal zone. Marsh wrens were once found all along the marshes of the Potomac, but have declined rapidly with the disappearance of their habitat, habitat largely destroyed and impacted by humans. In 1950, 87 singing males were counted in Dyke Marsh, but by 1998 only 31 territories were found.[3] Even fewer have been found in recent years. Larry Cartwright, head of the annual FODM breeding bird survey says, "The fate of marsh wrens and least bitterns remain in doubt at Dyke Marsh, but the trend suggests eventual disappearance for at least the marsh wren." Other bird species of concern in Dyke Marsh include the least bittern (*Ixobrychus exilis*), king rail (*Rallus elegans*), Virginia rail (*Rallus limicola*) and sora (*Porzana carolina*).

Dyke Marsh is listed on the Department of Game and Inland Fisheries' Virginia Birding and Wildlife Trail. Dyke Marsh and the Hunting Creek Bridge are birding "hotspots" on e-bird.org, sponsored by the Cornell Ornithology Laboratory, the National Audubon Society and other organizations.

In addition, like all wetlands, Dyke Marsh provides important ecological services like enhancing water quality, filtering pollutants, buffering storm surges and absorbing floodwaters.

As far back as 1947, naturalist Louis Halle wrote that Dyke Marsh is "the nearest thing to primeval wilderness in the immediate vicinity of the city." Mount Vernon resident and U. S. Senator John Warner, has called the wetland "a magnificent little oasis."

Dyke Marsh has been abused over the years: excavated, dumped in and invaded by non-native species, like English ivy, porcelain berry, the Chinese snail and the snakehead fish. It suffers from poaching, runoff, pollution, trash and erosion. The health of Dyke Marsh is dependent on multiple factors but especially on strong management of air and water pollution in the region.

Unhealthy Waters

The Potomac River, a drinking water source for five million people, is not healthy. In 2012, American Rivers identified the Potomac "the nation's 10 most endangered

river." In December 2011, the Potomac Conservancy gave the river a D, down from a D+ in 2007 when the Conservancy last "graded" the waterway. In 2011, the grade for overall health of the Potomac River was dropped from a C to a D by EcoCheck in partnership with the National Oceanic and Atmospheric Administration and the University of Maryland's Center for Environmental Science. Four of six indicators declined.

Hunting Creek is listed on the Virginia Department of Environmental Quality's 2012 list of Impaired Waters - 303(d) List.[4]

We note that the federal Clean Water Act became law in 1972 with the goal of achieving zero discharge of pollutants by 1985 and an interim goal to have "fishable" and "swimmable" water by 1983, a goal not yet met, 30 years later.

The CSS Permit Application

The Friends of Dyke Marsh support the city's efforts to meet the Total Minimum Daily Load (TMDL) for Hunting Creek and the city's recognition that "further reductions in CSOs are needed. . . to comply with the loadings specified in the recent Hunting Creek Bacteria TMDL." [5]

The Friends of Dyke Marsh offer the following comments on the permit application and related documents, including addressing inadequacies of the Long Term Control Plan (LTCP), the need for better data and communication with the public and coordination with the city's MS4 Phase II permit.

Inadequacies of the plan

1. Introduction of untreated sewage to waterways must be eliminated.

Our overriding comment is that it is simply unacceptable to allow any amount of untreated sewage to enter the waterways from the city of Alexandria or any source in the 21st century. While the permit application and the LTCP contain mitigation projects and practices to reduce the amount of combined sewer overflows, they do not contain plans that would lead to eliminating the discharge of untreated sewage.

2. The schedule for achieving the TMDL goals is far too long.

Section E.4 of the draft permit requires the city to develop and complete implementation of the Long Term Control Plan Update for the Hunting Creek Bacterial TMDL "as soon as practicable" but no later than Dec. 31, 2035," *32 years* from now. The city's first LTCP was approved by DEQ in February 1999.

The Friends of Dyke Marsh believe that taking 32 years to eliminate combined sewer overflows is far too long. A more aggressive schedule is needed, given the frequency of events and the very small amounts of rainfall or snowmelt that can cause overflows, as discussed in comment 6 below. In addition, many studies show that as the climate warms, intense weather events like severe storms and

hurricanes, will become more numerous and more frequent, further burdening the sewer system and exacerbating overflows.

3. Control solid and floatable materials.

Section D.6 of the draft permit states that "the permittee shall continue to implement measures to control solid and floatable materials in the CSS," including "consideration" of entrapment and baffling devices to reduce discharges of solids and floatable materials.

The Friends of Dyke Marsh believe that "consideration" is too weak a requirement. Floatable materials -- cans, bottles, plastics, cigarette butts, trash of all kinds and other debris – are widespread and common in the wetland and in Hunting Creek, clearly evident in a low-tide visit to the Hunting Creek Bridge on the George Washington Parkway or any visit to Dyke Marsh or the Potomac River shoreline in Fairfax County. The mudflats on both the creek and Potomac sides of the bridge, prominent feeding areas for shorebirds, egrets, herons, turtles and other species, are littered with debris.

Twice a day the tide washes up debris into Dyke Marsh and debris flows from Washington, D.C., Alexandria and boaters into Dyke Marsh. Among other concerns, we know that small animals can become trapped in cans and bottles. Fish, birds and other animals mistake cigarette butts for food. Plastic items rarely biodegrade. Animals mistake plastic and Styrofoam debris, especially small pieces, for food. Birds become entangled in six-pack rings. Animals can suffocate or choke when caught in plastic bags.

Trash from the Potomac can enter the Chesapeake Bay and the Atlantic Ocean, endangering freshwater and marine wildlife that may ingest or become entangled in the debris, resulting in injury or death.

The Alice B. Ferguson Foundation, which organizes annual cleanups in the Potomac watershed, collected 312 tons of trash to date in 2013.[6] While Alexandria constitutes a small portion of the watershed, the city's contribution seems to be concentrated in Hunting Creek and comes mainly from storm sewers. Members of the Friends of Dyke Marsh members engage in cleanups and report Hunting Creek as a rich source of debris of all kinds.

4. Signs at CCS outfalls

Section D.8.a requires that "identification signs at all CSS outfalls are maintained and easily readable by the public."

While signs are currently posted, the wording on these signs is somewhat misleading. The wording is, in part, "Combined stormwater and sanitary sewage may be discharged at this location during and after heavy or long rain events." According to data on the minimum rainfall needed to cause an overflow event (see

comment 6 below), the terms "heavy" and "long" are misleading because according to the Fact Sheet, rainfall from 0.03 to 0.21 inches could lead to overflows. The current signs may lead citizens to misunderstand the likelihood of an overflow.

In addition, some of the signs are not easily readable by the public:

- The signs should stand at eye level. Two signs are too high to be easily read or even noticed by the public: the sign at Outfall 001 (Oronoco Bay) is eight feet four inches high (measured from boardwalk level to top of sign) and the sign for Outfalls 003/004 on the walkway along Holland Lane is nine feet two inches high (measured from ground to top of sign). Besides being too high, the Holland Lane sign is parallel rather than perpendicular to the path and thus not noticeable to walkers.
- The sign for Outfalls 003/004 along the path between Jamieson Avenue and Duke Street is barely visible through the vegetation inside the pathway railing. While we believe signs should be visible to the public, we hope you will try to preserve native plants in the area, like milkweed, the host plant for several butterfly species that are declining.

There is no sign on the east side of Hooff's Run in the area where the Run is accessible.

We also hope you will consider making the signs bilingual, in English and Spanish, given the area's growing Hispanic population.

5. Implementing green initiatives

Section E.8.b of the draft permit says the "permittee shall study, implement and promote green infrastructure projects. . . ."

While the city may need to identify appropriate sites, the Friends of Dyke Marsh believe further study of "green infrastructure" or low-impact development approaches is unnecessary and will delay implementation. Green infrastructure is becoming more common and many examples exist across the U.S. that the city of Alexandria should adopt and implement, including Fairfax County, the District of Columbia, Chicago and Portland, Oregon.

6. Likely low impact of proposed mitigations

We support the green initiatives and other mitigation approaches that we hope will reduce the amount of water flowing into the storm sewers. We note, however, that very little rainfall or snow melt is required to trigger an overflow event. As presented in the CCS Permit Fact Sheet (p. 2-3), the "minimum rainfall for overflow event" amounts are quite small, at 0.03, 0.06, 0.16, and 0.21 inches. As a result, 139 overflow events were expected during 2011, apparently according models, that put nearly 113 million gallons of overflow into Hunting Creek and the Potomac.[7]

At an August 5 meeting of the Alexandria Environmental Policy Commission, Mr. William J. Skrabak, Deputy Director of the city's Office of Environmental Quality,

was clear, that, in his words, "most rainfall events" cause overflow. He said that "the system cannot carry anything more than a slight drizzle."

It seems unlikely that the mitigation measures listed in the current draft permit will have a significant impact in reducing overflows.

Need for better data and communication with the public

1. Outdated overflow event data

Overflow event data are presented in the CCS Permit Fact Sheet (p. 4, Table 1). These data are out of date. The table notes that these data are either "Approximations; per permit application, dated 8 July 2011, for the time period of June 2010 – May 2011, or 2011 Annual Report Model Summary data." Given the monitoring described in the permit, more recent and some observation-based data should be provided, especially for the number of overflow events.

2. Trends in bacterial levels

Information on progress in achieving the Hunting Creek TMDL is difficult for the public to access online. For example, the 2011 Combined Sewer System Annual Report for 2011 contains appendices showing sampling results for Hunting Creek and Oronoco Bay. These data are point-in-time data and do not indicate trends over time. The CSS Permit Fact Sheet may contain this information in appendices, but pages 46 through the end are illegible.

The annual report required in Section E.5.a of the draft permit should contain information on trends in bacterial levels and other measures, and progress toward meeting the TMDL in language that the average person can understand. Trend data is critical in knowing how and whether water quality is improving or not.

3. Publication of annual reports

Section E.5.a of the draft permit requires the city to "publish the annual reports on the City's website and retain the reports on the website for a period of no less than two years."

Currently, we are unable to find an annual report on the city's website. The 2011 report, the 17th such report, is posted on the VDEQ website, although it is somewhat difficult to locate. According to August 2013, email communications with a city official, the 2012 annual report was completed in March 2013, but is not currently available on the city's website. A hard copy of the report can be viewed by appointment, thus making access cumbersome and limited.

The permit should require that annual reports be posted on the city of Alexandria website as soon as they are completed and be retained on the site a longer period. At a minimum, the three most recent reports should be retained on the site.

4. Accuracy and currency of biological inventory

The Fact Sheet (p. 7) provides information on threatened or endangered species that are in the vicinity of the discharges from the combined storm and sanitary sewers:

> "The following threatened and endangered species were identified within a 2 mile radius of the outfalls: Brook Floater (mussel); Grizzled Skipper (butterfly); Bald Eagle; and Migrant Loggerhead Shrike (song bird)."

This information does not appear to be accurate or current. We urge DEQ to use accurate and more current data. Also, we recommend that scientific names also be included in the description of threatened and endangered species, as common names are variable.

Concerning the loggerhead shrike, the Virginia Society of Ornithology has documented a precipitous decline of this species.[8] No loggerhead shrike has been reported in Alexandria or in Dyke Marsh for at least 50 years, according to experienced bird watchers in the area.

The bald eagle is no longer listed as a federally-endangered species, having been removed from the list by the U.S. Fish and Wildlife Service in 2007. However, the bald eagle remains protected by federal law. Dyke Marsh and the Potomac corridor south of Alexandria are home to bald eagles, which are often seen feeding on fish from the Potomac or perched along the shoreline.

The Virginia Department of Game and Inland Fisheries lists the peregrine falcon as a state-threatened species. [9] The peregrine falcon has been reported within two miles of Alexandria as recently as 2012 and has been observed during the weekly Dyke Marsh bird walks as recently as September 2012.[10]

The grizzled skipper (Appalachian Grizzled Skipper, *Pyrgus centaureae wyandot*) was last observed in Northern Virginia prior to 1950.[11]

According to information from National Park Service biologists, two mussel species on the 2010 Maryland Species of Concern list have been observed at Daingerfield Island, within the city of Alexandria: the tidewater mucket (*Leptodea ochracea*), and the eastern pond mussel (*Ligumia nasuta*). The brook floater (*Alasmidonta varicosa*), mentioned in the permit, is also on the Maryland list, but has not been observed in the Potomac area included in the Park Service data (Great Falls to Mount Vernon).[12]

These are examples that indicate to us that more thorough and more accurate information is needed on the flora and fauna that are affected by current and future combined sewer overflows from Alexandria.

5. Little information on impacts downstream

The permit and fact sheet contain little information on the impacts of combined sewer overflows and pollution on downstream wildlife and human health.

While perhaps beyond the scope of normal permitting practices, we believe that downstream impacts on water quality and natural resources are quite serious, adverse and should be evaluated.

Coordination with Chesapeake Bay MS4 permit.

The development and implementation of the LTCP is occurring at the same time as implementation of plans and projects to address Alexandria's allocation of stormwater reduction under the city of Alexandria's MS4 Phase II permit. Because the goals are congruent and projects may benefit, progress on both the MS4 and the CSS requirements, plans for the two activities should be coordinated and should be communicated to the public as joint activities.

Thank you for the opportunity to submit these comments. We look forward to working with the city and state toward a cleaner Potomac River, its tributaries and a healthy and restored Dyke Marsh.

---

[1] Based on comments by William J. Skrabak, Deputy Director, Transportation and Environmental Services, City of Alexandra, at the August 5, 2013, public meeting on the Draft CSS Permit.

[2] http://www.fodm.org/reports.htm

[3] University of Maryland Center for Environmental Studies, http://www.umces.edu/sites/default/files/al/pdfs/dmp-wb2.pdf

[4] http://www.deq.virginia.gov/Portals/0/DEQ/Water/WaterQualityAssessments/IntegratedReport/2012/ir12_Appendix1a_Category5_List.pdf

[5] July 8, 2011 letter to Doug Frasier, DEQ, from Bruce Johnson.

[6] http://fergusonfoundation.org/trash-free-potomac-watershed-initiative/potomac-river-watershed-cleanup/

[7] CCS Permit Fact Sheet, Table 1, p. 4.

[8] Virginia's Birdlife, 4th Edition, 2007, p. 195.

[9] http://www.dgif.virginia.gov/wildlife/virginiatescspecies.pdf

[10] www.e-bird.org observation report 12/17/2012. Dyke Marsh sightings at http://www.fodm.org/sighting.htm

[11] Virginia Department of Conservation and Recreation's Virginia Rare Species list http://www.vararespecies.org/95

[12] Telephone conversation with Brent Steury, NPS, George Washington Memorial Parkway, 8/7/2013, Maryland list found at http://www.dnr.state.md.us/wildlife/Plants_Wildlife/rte/pdfs/rte_Animal_List.pdf

Frasier, Douglas (DEQ)

From: Frasier, Douglas (DEQ)
Sent: Monday, July 29, 2013 12:43 PM
To: 'Drudi, Dino - BLS'
Subject: RE: Comments on City of Alexandria Draft Combined Sewer System Permit

Dino Drudi,

This acknowledges receipt of your comments; which will be included in the agency record for this permit reissuance.

Best regards,

Douglas Frasier
VPDES Permit Writer, Senior II
Certified Nutrient Management Planner
Regional Toxics Management Program Coordinator
Department of Environmental Quality
Northern Regional Office
13901 Crown Court, Woodbridge, VA 22193
Phone: 703-583-3873
Fax: 703-583-3821
Douglas.Frasier@deq.virginia.gov

From: Drudi, Dino - BLS [mailto:Drudi.Dino@bls.gov]
Sent: Monday, July 29, 2013 11:33 AM
To: Frasier, Douglas (DEQ)
Cc: 'Lalit.Sharma@alexandriava.gov'; 'contactus@alexandriava.gov'; 'Alexandria Times Letters'; 'Alex/MV Gazette'
Subject: Comments on City of Alexandria Draft Combined Sewer System Permit

I am a homeowner in Old Town Alexandria and am hereby submitting the following formal comments:

1. Renew Alexandria's Combined Sewer System Permit without requiring extensive construction within either of Old Town's two the historic districts (Old & Historic or Parker-Gray);
2. Explicitly grandfather the combined sewers in Old Town's two the historic districts;
3. Seek congressional riders which ratify the proposed grandfathering.

Old Town's combined sewer system was considered state-of-the-art when it was installed and, consequently, should be grandfathered. Extensive construction work in the historic district would be expensive and disruptive because the streets are built to 18th and 19th Century "horse-cart" standards. The houses are old and historic, often sitting on slabs without cellars, and are vulnerable to vibration damage. Extensive construction would be unduly burden and inconvenience property owners, residents, and businesses in historic district.

The pollution resulting from the combined sewers in Old Town's two the historic districts has existed for over a century and was not considered environmentally overly burdensome on the infrequent occasions it occurred. The Potomac River and Hunting Creek can absorb and naturally clear some level of pollution. Water quality has degraded only as a consequence of new development after Old Town's combined sewers were installed, so priority should be given to reducing pollution from new development rather than overly burdening historic district.

Respectfully submitted,

Dino Drudi
315 N West Street (contributing structure in the Parker-Gray Historic District)

Old Town, Alexandria, VA 22314

Frasier, Douglas (DEQ)

From: Frasier, Douglas (DEQ)
Sent: Tuesday, July 23, 2013 3:03 PM
To: Thomas, Bryant (DEQ)
Subject: FW: Alexandria Combined Sewer System Permit Reissue

From: Kathryn Papp [mailto:kpappva@gmail.com]
Sent: Tuesday, July 23, 2013 2:59 PM
To: Frasier, Douglas (DEQ)
Subject: Re: Alexandria Combined Sewer System Permit Reissue

Dear Douglas:

Thank you. I did realize that the Oronoco remediation was separate from combined sewage, and they're doing a great job. My concern is the state of all pipes laid down in that period, which the sewage pipes in the combined system are. I am familiar with similar systems in Pittsburgh and Philadelphia.

I've looked at the proposal to do a number of pilot projects as part of this effort. The track record on environmental pilot project relication is very poor. The city's have never been extended for larger impact. I'll talk with Bill Skraback about this and see if there is an alternative that could be a better use of scarce funds.

Again, thank you. This may be on the city site, but it is good to have you "in the loop".

Best,
Kathryn Papp

On Tue, Jul 23, 2013 at 2:06 PM, Frasier, Douglas (DEQ) <Douglas.Frasier@deq.virginia.gov> wrote:

Ms. Papp,

Thank you for your interest in the reissuance of the aforementioned permit. I have provided answers to your questions below. I will be referring to the Fact Sheet, which you may have already read, for the reissuance on some responses since this document provides a full explanation regarding your inquires.

The Fact Sheet is available at the following address: http://www.deq.virginia.gov/fileshare/wps/PERMIT/NRO/City%20of%20Alexandria%20CSS/. This document is also available on the City's website.

Does the proposed release of overflows during wet weather events of the combined sewer system contain untreated human waste?

Yes, combined sewer overflows discharge a mixture of stormwater and untreated human waste during wet weather events.

Is there a time limit on reissuance of this permit, ie how long will this system be allowed by the state to expel waste water from the combined sewer systems into the Potomac?

The City will be exploring various options (green infrastructure, engineering projects etc) to include in the Long Term Control Plan Update which is due within 3 years after the permit is reissued. This update will provide the path forward to mitigate the combined sewer overflows to comply with the Hunting Creek Bacteria Total Maximum Daily Load. This implementation plan is to be completed as soon as practicable but no later than 31 December 2035 (see Page 12, Section 21.d. of the Fact Sheet for a detailed explanation).

Concurrently, during this time, the City will also be implementing projects to achieve a reduction of 5 million gallons of stormwater entering the system, or the bacteria equivalent, annually by the end of this permit term; which includes a sewer separation project, outfall improvements and green infrastructure projects (see Page 14, Section 21.h. of the Fact Sheet).

Although monitoring is well-described, how is reporting to the public on a regular basis done, especially concerning human health issues? This is of growing concern as severe weather events are increasing in this area, e.g., GAO is pursuing stricter requirements for FEMA to reimburse municipalities for frequent flood events.

The City is required to submit annual reports every year by 31st of March. These reports contain all monitoring data, projects completed and planned and various pertinent information concerning the operation and maintenance of this system. The City will be posting these reports on their website beginning with this permit term and are also available from Department of Environmental Quality-Northern Regional Office upon request. Previous annual reports are also available.

Recent remediation efforts in the Oronoco Bay area, a VA-DEQ designated brownfield site, has revealed sewer pipes in much worse condition than anticipated. How will reissuing this permit delay replacement of what seems to be a severely eroded system of deteriorating pipes?

I spoke with Lalit Sharma with the City of Alexandria regarding this project. The sewer at Oronoco St is a storm sewer (separate) and an insitu remediation system is being installed to address contamination from an old coal gasification plant. This work is being done under the Voluntary Remediation Program. This project is completely unrelated to combined sewer system and relining of the sewer is scheduled to be done from a infrastructure rehab standpoint.

There are two links with information on this project:

http://alexandriava.gov/tes/oeq/info/default.aspx?id=3846#oronoco

http://alexandriava.gov/OronocoRemediationProject

For further information, the project lead (information below) can also be contacted.

Daniel Imig, Project Manager
Office of Environmental Quality (OEQ)
Transportation & Environmental Services (T&ES)
Email: daniel.imig@alexandriva.gov
Telephone: 703-746-4070

This system, as many across the nation, is a remnant of early infrastructure that present challenges for the installation of controls and sewer separation; with no quick fix. With that, this permit is complex and contains many facets that are occurring simultaneously but are intertwined.

If you would care to discuss this permit further, please do not hesitate to contact me.

Best regards,

Douglas Frasier

VPDES Permit Writer, Senior II
Certified Nutrient Management Planner
Regional Toxics Management Program Coordinator
Department of Environmental Quality
Northern Regional Office
13901 Crown Court, Woodbridge, VA 22193
Phone: 703-583-3873

Fax: 703-583-3821
Douglas.Frasier@deq.virginia.gov

From: Kathryn Papp [mailto:kpappva@gmail.com]
Sent: Friday, July 19, 2013 10:34 AM
To: Frasier, Douglas (DEQ)
Cc: Sharon Annear
Subject: Alexandria Combined Sewer System Permit Reissue

Dear Mr. Frasier:

RE: The Public Notice - Environmental Permit for the City of Alexandria 301 King Street, Room 4100, Alexandria VA 22313 #VA0087-68 .

Questions:

1 - Does the proposed release of overflows during wet weather events of the combined sewer system contain untreated human waste?

2 - Is there a time limit on reissuance of this permit, ie how long will this system be allowed by the state to expel waste water from the combined sewer systems into the Potomac?

3 - Although monitoring is well-described, how is reporting to the public on a regular basis done, especially concerning human health issues? This is of growing concern as severe weather events are increasing in this area, e.g., GAO is pursuing stricter requirements for FEMA to reimburse municipalities for frequent flood events.

4 - Recent remediation efforts in the Oronoco Bay area, a VA-DEQ designated brownfield site, has revealed sewer pipes in much worse condition than anticipated. How will reissuing this permit delay replacement of what seems to be a severely eroded system of deteriorating pipes?

Comment:

This is not an uncommon situation in all old East Coast cities; however, it's continued existence has reached a point where it is highly questionnable to allow any further delay in replacement and/or repair.

An updated plan is simply delay without action. Continued release of E. coli, chlorides, and certain suspended Solids is particularly harmful.

Thank you for your attention and effort in addressing my questions.

Sincerely,

Kathryn Papp

State "Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name:	Alexandria Combined Sewer System
NPDES Permit Number:	VA0087068
Permit Writer Name:	Douglas Frasier
Date:	30 August 2012

Major [X] **Minor** [ ] **Industrial** [ ] **Municipal** [X]

I.A. Draft Permit Package Submittal Includes:	**Yes**	**No**	**N/A**
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?		X	
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?			X
8. Whole Effluent Toxicity Test summary and analysis?		X	
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics	**Yes**	**No**	**N/A**
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet or permit contain a description of the wastewater treatment process?			X
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?			X
5. Has there been any change in streamflow characteristics since the last permit was developed?		X	
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet or permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?	X		
a. Has a TMDL been developed and approved by EPA for the impaired water?	X		
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?	X		
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?			X
10. Does the permit authorize discharges of storm water?			X
I.B. Permit/Facility Characteristics – cont.	**Yes**	**No**	**N/A**
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	

1.B. Permit/Facility Characteristics – cont.	Yes	No	N/A
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?			X
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?			X
14. Are any WQBELs based on an interpretation of narrative criteria?			X
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a potential impact to endangered/threatened species or their habitat by the facility's discharge(s)?	X		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?	X		
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist

Region III NPDES Permit Quality Checklist – for POTWs
(To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	NOT APPLICABLE		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)	Yes	No	N/A
1. Does the permit contain numeric limits for ALL of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	NOT APPLICABLE		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?			
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?			
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?			
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?			
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			

II.D. Water Quality-Based Effluent Limits	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?			X
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?			X

II.D. Water Quality-Based Effluent Limits – cont.	Yes	No	N/A
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?			X
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?			X
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?			X
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?			X

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	NOT APPLICABLE		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?		X	
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?			X
4. Does the permit require testing for Whole Effluent Toxicity?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?			X
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont.	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?		X	
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?	X		
a. Does the permit require implementation of the "Nine Minimum Controls"?	X		
b. Does the permit require development and implementation of a "Long Term Control Plan"?	X		
c. Does the permit require monitoring and reporting for CSO events?	X		
7. Does the permit include appropriate Pretreatment Program requirements?			X

II.G. Standard Conditions	Yes	No	N/A
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		

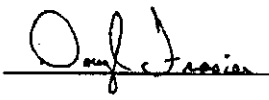
List of Standard Conditions – 40 CFR 122.41

Duty to comply	Property rights	Reporting Requirements
Duty to reapply	Duty to provide information	Planned change
Need to halt or reduce activity	Inspections and entry	Anticipated noncompliance
not a defense	Monitoring and records	Transfers
Duty to mitigate	Signatory requirement	Monitoring reports
Proper O & M	Bypass	Compliance schedules
Permit actions	Upset	24-Hour reporting
		Other non-compliance

2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part III. Signature Page

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	Douglas Frasier
Title	VPDES Permit Writer, Senior II
Signature	
Date	30 August 2012

EPA Comment:

Pg. 1 of 8, Part I,A. Effluent Monitoring Requirements pg. footnote (2) states that outfall 002/003/004 shall comply with the TMDL bacteria waste loads, it should also state that the outfalls should comply with water quality standards.

DEQ Response:

A Special Condition was added with this revision in Part I.E.13, Page 9 of the permit:

> *The permittee may not dischorge in excess any effluent limitation necessary to meet applicable water quality standards imposed under the State Water Control Law or the Clean Water Act.*

This reflects language found in the DC0021199, District of Columbia Water and Sewer Authority's NPDES permit, Part II, Section A.2.

EPA Comment:

Pg. 5 of 8, Part I E. 4. LTCPU – "The final LTCPU shall be submitted on or before 4 years from the effective date for DEQ review and acceptance." This is far too long of a period of time to submit the LTCPU for review and approval after DEQ has commented on the LTCPU. Alexandria should only have no more than 1 year to submit the LTCPU. Four years is an excessive period of time. The word acceptance is inappropriate for permit language. The correct wording should be review and approve if the LTCPU meets **EPA LTCP Guidance (EPA-832-B-95-002).**

DEQ Response:

The draft permit incorporates a regulatory framework which institutes a dual approach to developing and implementing CSO controls. The two approaches are complimentary and combine both short term and long term initiatives. The required short term programs will achieve CSO reductions during the permit term. The long term, and primary requirement, is the update of the Long Term Control Plan (LTCP) to ultimately achieve compliance with the Hunting Creek bacteria TMDL, including all applicable water quality standards. It is important to note that the near term programs and controls being instituted to achieve results during the permit term will also help to inform final decisions to be incorporated in the LTCPU.

Please refer to the Fact Sheet on Page 12, Section 21.d for a discussion of the regulatory requirements contained within the draft permit. A 3-year period for submittal of a final Update for approval has been proposed. This would allow for a value-engineered approach for mitigating the overflows while engaging all concerned parties; Fairfax County, the City of Alexandria, AlexRenew Enterprises and the public. It also recognizes that there will be significant development and implementation of CSO control actions and measures during this permit term. Specifically, (1) green infrastructure projects will be installed and evaluated to determine effectiveness and possible incorporation into the LTCPU; (2) a sewer separation

project will commence, with the ultimate goal of disconnecting ninety-two (92) sanitary connections from the combined sewer system and rerouting the flows to a separate sanitary sewer system; and (3) outfall improvements will be required with the goal of capturing additional wet weather flow. Ultimately, the permittee must obtain a reduction in bacteria loading to be achieved either through at least a 5 million gallon annual reduction of stormwater entering the CSS, or the equivalent E. coli load reduction, during this permit term.

Note that the word 'acceptance' has been replaced with 'approval' in all locations where it appeared in the draft permit.

EPA Comment:

The draft permit states, "The LTCPU shall contain clearly defined, measurable milestones that will demonstrate compliance with the aforementioned TMDL as soon as practiced but no later than 31 December 2035." Twenty two (22) years to meet the TMDL is far too long time, not to mention fully implementing the LTCPU. Also, the permit fails to state the Alexandria has to meet the water quality standards and meet LTCP requirements, as stated in the **EPA LTCP Guidance (EPA-832-B-95-002)**.

DEQ Response:

As discussed above, the regulatory approach incorporated into the draft permit includes both near term and long term requirements, each with associated goals and outcomes. DEQ supports this path forward as it both achieves results in the short term, while also ultimately ensuring compliance with water quality standards. Once finalized, the LTCPU will be required to be fully implemented in less than 20 years in order to meet the 2035 compliance date.

Please refer to the Fact Sheet, Page 12, Section 21.d for details on the LTCPU. It is staff's best professional judgement that this time frame is justified given the complex nature of this system. This is a highly developed, densely populated area presenting challenges that other systems across the nation face with legacy combined sewer systems. Integrated gray and green engineering projects require extensive engineering evaluation, planning and implementation, even for relatively small CSSs. Furthermore, this general regulatory approach to more fully incorporate green infrastructure and to integrate stormwater and wastewater controls is consistent with the approaches encouraged by EPA in memorandum's published in 2011(see Fact Sheet Attachments 15 & 16).

Finally, it should be noted that staff anticipates that sewer separation will be the primary vehicle for achieving compliance. The implementation schedule reflects this understanding. However, complete sewer separation would impact businesses and residents, possibly producing economic impacts to the area. CSO Control Policy, Section II.C.S does allow for appropriate cost/performance considerations to help guide the selection of controls. Therefore, it is also understood that if engineering controls that are less disruptive, yet just as effective are found to be the best option, then the implementation time frame could be reduced.

The Fact Sheet explicitly states that the LTCPU will also provide for combined sewer overflow controls to comply with all applicable water quality standards for the receiving waters (*EPA Guidance for LTCP, September 1995*), consistent with the Clean Water Act Section 402(q) and State Water Control Law.

EPA Comment:

Pg. 6 of 8, Part I E. 8.a, Combined Sewer Service Area Reduction Plan(ARP) requires the separation of storm and development projects whenever feasible. An estimated schedule should be provided and the whenever feasible statement be deleted.

DEQ Response:

The ARP is dictated by development/redevelopment within the CSS sewer shed area; thus, dependent upon the area's economic engine. This is a factor outside the control of the City. However, the City is required to submit any ongoing and proposed development projects and schedules annually that are occurring/would occur in the CSS sewer shed (Part I.E.8.a.).

The statement 'whenever feasible' has been removed.

EPA Comment:

Pg. 6 of 8, Part I E. 8.c, Green Public Facilities, A plan of the proposed city maintenance work and the options available for inclusion of green infrastructure projects should be presented. Remove feasible options shall be implemented.

DEQ Response:

The revised draft permit requires the City to submit: (1) a schedule of maintenance/enhancement projects at city facilities within the CSS sewershed for the forthcoming fiscal year; (2) the City's process for evaluating inclusion of green infrastructure; and (3) green infrastructures planned for selected projects with each annual report (Part I.E.8.c.).

The above 'feasible options shall be implemented' language has been removed.

EPA Comment:

Pg. 7 of 8. Part I E. 8.e, there is no schedule attached to the requirement implement proposed improvements at outfall 003/004. A schedule with defined milestones to complete this work is required.

DEQ Response:

The revised draft permit requires the City to implement the final improvements at Outfall 003 and Outfall 004 thirty (30) months from the permit effective date. Additionally, the City is required to submit a Preliminary Engineering Report (PER) to DEQ for review and approval once the final alternative is selected and prior to beginning any improvements (Part I.E.8.e).

EPA Comment:

Pg. 7 of 8. Part I E. 9., Green Maintenance proposes a data base to track projects, again the delivery date is the end of the permit term. Interim milestones need to be established.

DEQ Response:

The revised draft permit requires the City to submit updates within 12 and 24 months of the permit effective date with a final report detailing the development and implementation of the database within 36 months of the permit effective date (Part I.E.9.).

Attachment C

Review Comments for the Draft Report: Bacteria TMDLs for the Hunting Creek, Cameron Run, and Holmes Run Watersheds dated July 19, 2010

City of Alexandria
Department of Transportation and Environmental Services
Office of Environmental Quality
301 King Street
City Hall, Room 3000
Alexandria, VA 22314
www.alexandriava.gov/Environment

August 18, 2010

Katie Conaway
Regional TMDL Coordinator
Virginia Department of Environmental Quality
Northern Regional Office
13901 Crown Court
Woodbridge, Virginia 22193
DELIVERED VIA EMAIL: Katie.Conaway@deq.virginia.gov

SUBJECT: Review Comments for the Draft Report: Bacteria TMDLs for the Hunting Creek, Cameron Run and Holmes Run Watersheds dated July 19, 2010

Dear Katie:

The City of Alexandria (City) appreciates this opportunity to comment on the Draft Report: Bacteria TMDLs for the Hunting Creek, Cameron Run and Holmes Run Watersheds (Draft Report) dated July 19, 2010. We would like to express our thanks to the Virginia Department of Environmental Quality (DEQ) for this inclusive process. However, we do have some very deep concerns with the process, the modeling assumptions and the application of what we see as unattainable water quality standards. We offer the following comments in continued support of the TMDL development.

While we are committed to working with the DEQ to implement the iterative watershed practices and plans outlined in the TMDL, we want to take a moment to summarize the process that has gotten us here. We hope that memorializing the process will provide some perspective for our comments that follow.

- The formal inclusion of stakeholders in the process of developing the TMDL began February 6, 2009 with a notice from DEQ that included a deadline of May 2010; however, a DEQ deadline for the TMDL was set for spring 2009.

- The City requested information on the models from the beginning. Following the first Technical Advisory Committee (TAC#1) meeting on March 10, 2009, the City initially requested documentation, calibration information and boundary conditions in TAC#1 comments dated March 31, 2009. Subsequent, additional formal and informal requests were also made during the process. However, the actual modeling information was not available until very recently – over a year later.
- A request made at TAC#1 and in the subsequent official comments referenced above for model runs with only wildlife sources was agreed to but has not yet been provided almost a year and a half later.
- Information on bacteria source assessment was provided seven months following the initial request on March 10, 2009.
- Staff learned that DEQ's preliminary findings may require possible changes to City's approved Combined Sewer System (CSS) Long Term Control Plan (LTCP) rather informally at a meeting held January 21, 2010– almost a year from the outset. Prior to this date, the City had yet to be informed as to how the CSS and associated outfalls would be modeled with respect to the boundary conditions, decay rate, calibration, or other assumptions.
- DEQ called an unplanned "Modeling Discussion" meeting on February 9, 2010. It was learned at this meeting that calibration was now complete for non-tidal Holmes Run and Cameron Run (HSPF) and tidal Hunting Creek (ELCIRC) modeling. It was also learned that scenarios were complete for the non-tidal waters. Scenarios had not yet been performed for the tidal waters, but the boundary conditions had been set at the water quality standards. The formal discussion of possible changes to the approved LTCP was included in the presentation. This meeting prompted a February 16, 2010 conference call. In response to the "Modeling Discussion" and the subsequent conference call, the City provided formal comments to DEQ dated February 25, 2010. While DEQ briefly discussed the contents of this letter at a PreTAC#3 meeting held sixteen weeks later (June 11, 2010), no written response to comments has been issued during this six month period.
- Finally, the City provided DEQ a "Path Forward" letter dated June 15, 2010 in response to the June 11th PreTAC#3 meeting. DEQ honored a request for a number of conference calls (June/July) and held a "Modelers Meeting" on July 28, 2010 to try to address our concerns. However, no formal response has been received to the "Path Forward" letter (over two months).
- The Draft Report came out about a week *before* the "Modelers Meeting". Most of the modeling information that had been requested over a year prior was provided at this late date; except the tidal model executable and corresponding source code due to assertions of "intellectual property". This left little time to review the modeling data. The absence of the model information made it impossible to conduct a thorough review.

The purpose of modeling is to develop a tool that will allow simulation of a natural system using observed conditions, which may be used as a predictive tool to accurately assess effectiveness of controls. Therefore, it is imperative that the model assumptions are based on observed conditions to properly simulate the natural system. Based on the foregoing, the City continues to have significant concerns with the modeling assumptions and find that DEQ management decisions based upon these erroneous assumptions and unattainable bacteria standards are not realistic.

Nevertheless, the City fully intends to continue working with DEQ to move forward with the process and address the modeling issues through the staged implementation process by focusing on stream impairments with a multi-pollutant, watershed approach.

As with most streams located in highly urbanized historic cities near the bottom of a larger watershed; the Hunting Creek, Cameron Run and Holmes Run waterways are maintained as flood control channels that have been highly modified. These waterways exhibit significant increased flows following a precipitation event and quickly return to pre-event conditions when precipitation ends ("flashy"). Flood control waterways must be dredged to remove sediment deposited from upstream sources, have been hard-armored to prevent bank scouring, and as a consequence have become channelized over time. Given that these waterways are not hydraulically suitable for primary contact use, swimming is not recommended nor is access provided for this purpose. Located at the confluence of this system with the Potomac River, the Hunting Creek embayment contains many mudflats that would not allow for full immersion – if swimming actually occurred.

It is clear that the primary recreational contact designated use standard is unattainable due to background sources of bacteria (including wildlife) and does not fit with the current or recommended use of these waterways. Accordingly, we agree that a TMDL which focuses implementation on costly measures that would not fully address impairment due to the contribution from wildlife from direct deposition and land sources is not prudent at this stage. Therefore, the City agrees with the proposed Staged Implementation in the Draft Report that considers a reasonable timeline and employs an adaptive management watershed approach in evaluating the effectiveness of a broad scope of cost-effective control practices to address sources of bacteria. Given time, this watershed approach holds the promise of targeting multiple pollutants of concern, while restoring habitat, creating green space, decreasing runoff, and imparting quality of life benefits for the citizens.

One specific example of the potential of this approach is the Cameron Run-Holmes Run stream restoration plan. That plan is a combined effort between the City of Alexandria, Fairfax County, the Northern Virginia Regional Commission and the U.S. Army Corps of Engineers to reduce nutrients and sediment deposition; restore stream habitat and riparian buffers to provide filtration; create wetlands; decrease impervious areas and increase open space/green space; provide improvements to existing landscape; reconnect the stream to the floodplain; and provide a more sloped bank. The Cameron Run-Holmes Run Watershed (which covers almost 60% of the entire City of Alexandria) focuses efforts on all of the study watersheds in this TMDL and has multiple objectives that would implement a multiple-pollutant strategy to not only target local bacteria impairments, but also address nutrient and sediment impairments in the Chesapeake Bay. Spending public funding on costly traditional control infrastructure (which would focus on a single pollutant in this case and does not provide reasonable assurance of a marked benefit to water quality) would divert needed resources from this holistic watershed effort. A watershed approach using staged implementation of iterative green solutions would not only provide local and Chesapeake Bay water quality benefits, but would also be environmentally sustainable, produce ancillary environmental and human health benefits, create educational awareness and have community support. This approach is also potentially much less costly than traditional solutions. Requiring the expenditure of hundreds of millions of public dollars for traditional infrastructure that will most likely not restore the waters to a designated

use category that is not utilized by the public will divert tax dollars from this important stream restoration. The City's goal is to work towards restoration of these watersheds to a more natural system for the benefit of water quality and its citizenry and will continue to work with DEQ to meet this goal.

The following comments are presented in three parts. PART I contains Overall Comments and Recommendations on a Path Forward. Part II includes Modeling and Waste Load Allocation Issues and PART III contains a Compilation of Specific Comments on the Draft TMDL Report.

PART I: Overall Comments and Recommendations on a Path Forward

A. Meeting the Standard Will Be Very Difficult

The TMDL documents make it clear that meeting the standard will be difficult in this heavily urbanized watershed given all of the sources, particularly sources like wildlife and urban runoff which are very difficult to manage. The City will however, move forward with cost effective actions through its storm water management programs and non-regulatory CSO Area Reduction Plan to achieve reasonable further reductions of loadings attributable to City discharges.

B. Full Use is Not Attainable

We want to thank the DEQ for acknowledging the attainability issues. It has been clear to everyone involved in the process that the level of reduction required in this TMDL for CSOs, MS4, wildlife, and other source sectors is unrealistic. We believe DEQ's proposed staged implementation approach is extremely appropriate in light of the attainability realities; particularly, the proposed 50% reduction in the direct deposition wildlife category and the proposed reductions in the wildlife component of the land sources. We think that DEQ should commit to reevaluate the TMDL in 10 years to reassess attainability in light of the staged implementation progress to that point.

C. Staged Implementation

We concur with DEQ's staged implementation approach. This approach is critical to evaluate attainable controls for CSO and MS4 discharges as well as reductions in the other sources that must be controlled to make progress toward achieving the E. coli standard. The staged implementation approach will prevent DEQ from having to guess now at what attainable levels of control are for various sources such as urban stormwater given the rapid evolution of those programs.

D. Level of Control and Staging of Implementation

The City concludes that the level of CSO reduction proposed is not warranted due to the attainability of reductions from all sources and due to modeling issues (discussed hereafter) that substantially over-estimate the relative impact of CSO. If the investment of public funds in CSO control is to achieve any benefit, it is imperative that the other dependent reductions, such as 50% reduction in direct wildlife sources

and the wildlife component of land sources, be demonstrated first. In other words before we implement further, non-cost-effective CSO controls, we need to evaluate what level of reduction is really attainable from the storm water, nonpoint source runoff and wildlife sectors. In addition, the serious modeling flaws identified below must be corrected so that attainable uses can be identified.

E. Modeling Issues

As described in detail below, we believe that model parameterization and application issues and the incomplete quantification of wildlife bacteria loads have resulted in an overstatement of the load from the CSO system. These modeling issues led the TMDL to over-emphasize the effectiveness of CSO controls. However, we believe that these issues can be addressed cooperatively within the staged implementation process laid out in the TMDL.

F. Collective Consideration of Discharges

We request that the ASA discharge and City CSO loadings be expressed as an aggregate allocation in addition to the individual WLAs within the TMDL. Such an aggregate allocation should specify that ASA may discharge up to its full permit limit but, to the extent ASA actually discharges below that limit on any given day, the difference in loadings between the permit limit and actual will be credited to offset the City's CSO discharges

G. Path Forward

While the City has serious concerns about the TMDL, our concerns can be addressed if the following path forward is adhered to within the staged implementation approach provided in the TMDL:

- City will continue its non-regulatory CSO Area Reduction Plan. This will reduce CSO loads in a cost effective manner over time.
- Staged Implementation – including recognition of maximum practical reduction approach similar to that being utilized in Maryland to identify interim attainable practices and programs that can be implemented to reduce bacteria loadings from all sources.
- Recognition that the serious modeling flaws must be corrected prior to requiring implementation of non-cost-effective and/or expensive infrastructure controls
- Continued recognition by DEQ of the need to do a Water Quality Standards Review during the staged implementation process, (we suggest ten years from now) to resolve the use attainability questions.

PART II: Modeling and Waste Load Allocation Issues

A. Modeling Information

There have been multiple TAC meetings as the TMDL developed. Following the TAC#1 meeting on March 10, 2009, the City initially requested documentation, calibration information, and boundary conditions in TAC#1 comments dated March 31, 2009. Subsequent, additional

requests were also made during the process. However, the actual modeling information was not available until very recently, and it did not include the ELCIRC model source code. With the limited amount of time available and due to proprietary issues with the ELCIRC Model, the City was unable to fully participate in and review model calibration, load estimation and waste load allocation to the degree that it had planned.

B. Bacteria Load

Although the City obtained limited modeling information very late in this process, it is clear from a review of the information that the simulated bacteria load to Hunting Creek embayment is underestimated. The City bases this observation on the box and whisker graphs within Figures 4-45, 4-46 and 4-47. The model fit (simulated values vs. observed data) is biased low in all instances across these calibration and verification years (2003 to 2005). All of the simulated median values are substantially lower than the observed median values (the only exception to this is the GW Parkway observed data for 2004, and DEQ has noted that these data were affected by a change in laboratory procedure and, accordingly, are not necessarily comparable). The median is a very important measure of central tendency, and it is especially valuable where the data (bacteria) vary over several orders of magnitude and are expected to have a log normal distribution. Fifty percent of values lie above the median, and fifty percent lie below. A systematic bias such as underrepresentation of the total bacteria load must be present given that all of the model simulated medians are substantially lower than the observed medians. It has been suggested that the observed data include a disproportional amount of wet weather observations, and that this might contribute to the poor fit between the median of the simulated values and the median of the observed data. It is the City's contention that this point has not been addressed in the Draft TMDL Report, and that it may not be relevant. Conditions in the outer part of the tidal Hunting Creek system are as much influenced by conditions in the Potomac River (independent of local rainfall) as they are by local rainfall in the watershed.

From a modeling standpoint, the tidal Hunting Creek system is not sufficiently loaded up with bacteria. The selection of a very low bacteria decay rate (0.1/day) for calibration supports this observation as there is an insufficient amount of bacteria in the tidal Hunting Creek system to support die off with typical decay rates. The results of the sensitivity analysis in which the decay rate is adjusted upward to 0.2/day, 0.3/day, 0.6/day and 0.9/day confirm this observation, as these adjustments lessen the amount of bacteria in the system and make the calibrations results look worse.

Given that the simulated bacteria load to Hunting Creek embayment appears to be insufficient, the City turned its attention to the potential sources and their representation in the modeling analysis. The three main sources of bacteria to the tidal Hunting Creek system are the ASA load, the CSO load, and the MS4 load simulated with HSPF. Each source is addressed separately.

ASA Load: This load is the easiest to represent in modeling as it is based on the routine discharge and bacteria observations reported to DEQ in DMRs. It is likely as accurate as it can be.

CSO Load: The CSO load is based on a calibrated hydrologic and hydraulic model of the combined sewer system. Model simulated flow values are associated with CSO-specific flow weighted event mean concentrations (EMCs) to estimate the bacteria load. A model-based daily time series of CSO discharge volumes by calendar year is reported to DEQ under the City's NPDES permit. The hydrologic and hydraulic model is well calibrated and, if anything, somewhat conservative in that it tends to slightly overestimate flow and CSO discharge. The EMCs are conservative too because they include the higher concentration first flush but not necessarily the more dilute last flush in storms of long duration. Consequently, the CSO load is generated in a conservative manner and, accordingly, overestimates the CSO load.

MS4 Load: The MS4 load is derived through use of a complicated application of the HSPF model to represent the build-up and wash-off of bacteria on the land surface that is augmented with interflow and baseflow contributions of bacteria. The ability of HSPF to replicate direct loads to the tidal Hunting Creek system is illustrated in Figures 4-16 and 4-17, the box and whisker graphs for Cameron Run and Hooff's Run. Area wise, Cameron Run represents a very large percentage of the entire watershed, and most of the upstream contribution. Looking at the box and whisker graph, the median of the simulated values is substantially lower than the median for the observed data. This indicates that the loadings going into the tidal Hunting Creek system are low. Consequently, this underrepresentation of the upstream bacteria load supports the previously observed situation in the tidal Hunting Creek system wherein the amount of simulated bacteria is lower than and does not match well with the observed data. The box and whisker graph for Hooff's Run (Figure 4-17) shows the same point, with the median of the simulated values much lower than the median of the observed data.

The development of the HSPF calibration targets may also be a contributing factor in the underrepresentation of bacteria loadings. The use of different assumptions for dividing the observed data into "storm" and "ambient" categories would perhaps result in a calibrated Cameron Run HSPF Model that brings higher load into tidal Hunting Creek.

This finding that the tidal Hunting Creek system is insufficiently loaded up with bacteria calls for additional technical evaluation to better capture within the TMDL modeling what is actually being seen in the system.

Presented in the Draft TMDL Report Source tracking and decay rates reveal that the TMDL misses sources of bacteria and the extent of those bacteria loads. With respect to the bacterial source tracking (BST) data based on the Antibiotic Resistance Analysis (ARA) presented in Table 3.22, it appears that the majority of the bacteria are positively linked to wildlife and pets.

Human sources and livestock are rather small in comparison to wildlife and pets at all three stations where ARA results are presented. The correct quantification of wildlife contributions is therefore very important to quantification of the total bacteria load.

The discussion on wildlife contributions to bacteria load (Sections 3.5.3) indicates that a variety of state sources were used to develop population density estimates for different wildlife types. The wildlife inventory presented in Table 3-30 raises some questions. First, the draft report indicates that there are 8,998 raccoons and 1,948 geese in Hunting Creek (including Cameron Run). This suggests that there are 4.5 times as many raccoons in the watershed as geese, or nine raccoons for every two geese. The City questions this ratio based on its own undocumented observations of many geese in the watershed.

Another question is centered on the reduction of the original geese population estimate by 85 percent based on a personal communication with Geese Peace. No detail is provided, and this reduction was apparently applied for the model calibration period but not for the model validation period. Its applicability for TMDL scenarios is unknown. In any event, this action results in less bacteria from wildlife sources when such loadings would have improved calibration of the models to median values of observed data at Cameron Run (Figure 4-16) and in the tidal Hunting Creek system (Figures 4-45, 4-46 and 4-47). Poor documentation of the 85 percent reduction in goose populations and the use of such reduction for calibration but not for validation purposes raise technical questions about the correctness of these modeling input assumptions and need to be better documented and, if necessary, corrected.

Finally, it is noted that seagulls and wading birds, both of which are abundant in the tidal Hunting Creek system, are not included as loading sources. In a recent report done for the City of Chicago entitled "Report to the City of Chicago on Conflicts with Ring-billed Gulls and the 2009 Integrated Ring-Billed Gull Damage Management Project" (Hartman, 2010), gulls are the focal point of adverse water quality impacts. The report notes,

> Recent research has documented a cause and effect relationship between gull use of habitats and increased bacterial contamination. Whitman and Nevers (2003) noted that the number of birds on a beach may relate to the bacterial contamination of recreational waters. Edge and Hill (2007) showed that bird droppings served as primary sources of *E. coli* contamination. Levesque et al. (2000) documented that the bacterial content of ring-billed gull droppings can contribute to microbiological contamination of recreational waters and Nugent et al. (2008) described how ring-billed and other gulls contributed to increased fecal coliform levels in a municipal drinking water source. Data collected on or near Chicago beaches in 2002 and 2003 indicated that gulls were the source of *E. coli* in 50 and 65% of the samples, respectively (Whitman et al. 2004). Gull numbers at beaches appeared to be significantly correlated with water and foreshore sand concentrations of *E.coli* taken 24 hours later (Whitman et al. 2004). DNA fingerprinting of *Salmonella* isolates from sand and water at 63rd St Beach were a reasonably good match to gull feces isolates, but other birds could also have been *Salmonella* vectors. Immediately to the north of Chicago, the Lake County Illinois Health Department has confirmed that gulls at North Point Beach and Illinois Beach State Park are the primary source of the *E. coli* as

illustrated by a DNA ribotyping study (M. Adam, Lake County, personal comm., July 29, 2009). Further public health concerns were noted at beaches heavily used by gulls when additional studies conducted by Lake County Illinois Health Department identified the pathogens *Salmonella* spp. and *Proteus mirabilis* in fresh gull feces at both of these beaches as well as other Lake County beaches (M. Adam, Lake County, personal comm., July 29, 2009). Swimming at North Point Marina Beach in Lake County was banned approximately 72 % of the time in 2009 because of elevated *E. coli* levels which were, in part, attributed to ring-billed gulls depositing fecal material on the beach (M. Adam, Lake County, personal comm. January 20, 2010). It has also been demonstrated that in Racine, Wisconsin gull feces is capable of carrying human pathogens (Kinzelman et al. 2008) and that gulls are a significant non-point source of fecal contamination on beaches (Kinzelman et al. 2004). (Note: Report and all references are found at: http://www.chicagoparkdistrict.com/docs/8e4762a1-a0fe-401c-8d6e-a68214d2dbb7_document.pdf)

Thus, the quantification of wildlife bacteria loads in the watershed is incomplete and under represents the total bacteria load. In turn, this error led the TMDL to overstate the significance of CSO and urban storm water loads and the subsequent reductions required by the TMDL.

The City also notes some unexplained inconsistencies in HSPF parameters that assign a constant bacteria concentration to groundwater (AOQC) and interflow (IOQC). As shown in the text table below, the AOQC and IOQC values for Hooff's Run (PERLND segments 91-97) are substantially higher than everywhere else in the watershed. No explanation is provided but it appears that the increase in Hooff's Run is aimed at matching the generally higher bacteria concentrations observed there. The technical basis for the range in concentrations used in the HSPF modeling is not addressed in the Draft TMDL Report.

HSPF	**AOQC**	**IOQC**
PERLND 91-97 (Hooff's Run)	53000 #/CF	60000 #/CF
All Other Subwatersheds	4248 #/CF	1 #/CF

Finally, the City noted that the HSPF instream decay rate for bacteria in the non-tidal reaches just above the tidal Hunting Creek waters was 10/day in Cameron Run and 2/day in Hooff's Run. The inconsistency with the decay rate of 0.1/day used in the tidal waters is discussed in a separate discussion of decay rates. However, the use of a decay rate of 10/day – a very high decay rate for any system –could explain some of the inability of the models to match median values of observed data at Cameron Run (Figure 4-16) and in the tidal Hunting Creek system (Figures 4-45, 4-46 and 4-47) in the calibration and validation process. A lot of bacteria die before they reach the tidal Hunting Creek system with this high decay rate of 10/day.

Not Presented in the Draft TMDL Report. This comment on what is not presented in the report is led by the observation that none of the loading sources address the direct input of bacteria into the tidal Hunting Creek system due to wildlife sources, sediment sources, and marine discharge from the nearby Belle Haven Marina. Each is addressed separately.

> **Wildlife:** Large waterbodies in the Cameron Run – Holmes Run watershed such as Cameron Pond, Lake Cook and the Winkler Botanical Preserve attract large numbers of geese, ducks and other wildlife. Athletic fields and open space areas also attract foraging geese. As one example of the bacteria contribution from geese, the athletic fields at Joseph Hensley (4200 Eisenhower Avenue) have been rendered unplayable at times due to the amount of geese excrement. The freshwater tidal wetlands and mudflats of the tidal Hunting Creek system are a magnet to many different types of wildlife, particularly seagulls, wading birds, and other waterfowl. Geese are certainly present, but other types of birds that feed on tidal mud flats are also common. The direct bacteria load from wildlife sources within the tidal Hunting Creek system (and from nearby Dyke Marsh, an important wildlife sanctuary) are not represented in the modeling. This underestimation in the contribution from these sources and the complete omission of bacteria loads from other wildlife sources is very important.
>
> **Sediment as a Source:** Sediment as a source of bacteria is not accounted for in the modeling but, given the large amount of wildlife on the mudflats, it could be very important. There is a growing body of literature that supports bacterial re-growth in sediments that can release bacteria to the overlying water column when disturbed. The TMDL erred in ignoring sediment as a source of bacteria.
>
> **Belle Haven Marina:** Belle Haven Marina sits at the southern end of the tidal Hunting Creek system. The marina offers storage, moorings and a launch ramp for boats. The marina does not have a pump-out facility for marine waste. The marina is mentioned as a possible source of bacteria from human sources that is not accounted for in the modeling.

In summary, the underrepresentation of bacteria in the tidal Hunting Creek system has been noted and several reasons for its existence have been offered. The consequences of this underrepresentation are consequential to the TMDL. First, the magnitude of the wildlife load is under reported. Given the challenge of controlling wildlife, this affects the long term goal and attainability of eventual compliance with the existing water quality standards for bacteria. Second, the insufficient amount of bacteria in the tidal Hunting Creek system results in an artificially low bacteria decay rate of 0.1/day. This low rate affects the TMDL scenarios wherein the low decay rate is continued to be used, and leads to overstatement of the importance and impact of urban stormwater and CSO discharges.

The underrepresentation of bacteria results in CSO loads being shown as a much higher fraction of total load than they actually are. It also means that the CSO controls called for in the TMDL will be even less effective in attaining the designated use due to the much higher actual

proportion of loads from other sources. As indicated in all previous modeling efforts (discussed below) further CSO controls will likely not return any days of beneficial use.

C. Bacteria Decay Rate

The Draft TMDL Report documents that three different bacteria decay rates are used in the modeling. As shown in the text table, the differences in these rates are quite substantial.

Stream Reaches and Tidal Embayment Cells	First Order Decay Rate for Bacteria	Temperature Correction
ELCIRC Tidal Hunting Creek Cells	0.1/day	No
HSPF Hooff's Run	2.0/day	Yes
HSPF All Other Reaches	10.0/day	Yes

No explanation for the difference that spans two orders of magnitude, from 10.0 /day to 0.1/day, is offered in the TMDL. This is a major technical issue that cannot be ignored. In addition, no explanation for using temperature correction with bacteria decay in HSPF but not in ELCIRC was offered. It appears that the decay rates were used to tune the calibration results. Otherwise, there is no obvious physical, chemical or biological basis for this range and the choice of rates. There should have been greater consistency within the watershed for the calibrated decay rates.

As a reference, the Potomac River TMDL for bacteria and earlier studies of bacteria in the tidal freshwater Potomac with the Potomac Dynamic Estuary Model (DEM) used a calibrated bacteria decay rate of 1.0/day consistent across all model segments (DC DOH, 2004, EPA 1979). This rate was calibrated in the early 1980s and has withstood the test of time. More recently, the nearby Tidal Four Mile Run TMDL water quality modeling, conducted with the public domain CE-QUAL-W2 model, utilized a bacteria decay rate of 0.45/day, while the HSPF watershed model used to simulate bacteria loads from MS4 areas in the upper watershed was calibrated with a bacteria decay rate of 1.0/day (VA DEQ, 2010). Both of these TMDL modeling efforts, conducted for nearby tidal and non-tidal waters, suggest that there is either a missing load of bacteria to Hunting Creek and/or perhaps an issue with the watershed model calibration targets.

The City does not agree at all with the last sentence on page 4-90 which states that *"the calibrated value of decay rate λ under low flow conditions should be expected to be toward the low end of values reported in the literature"*. This statement attempts to link low velocity to a low decay rate, and it is presented as a fact. However, it really is not closely tied to the theoretical discussion presented regarding the sensitivity of the model predictions to the bacteria decay rate. The sensitivity as explained is understood, since the residence time in areas of the

embayment experiencing low velocity would be expected to be higher than in regions of the embayment experiencing higher velocities due to tidal action. However, this does not translate to an expectation that that the calibrated bacteria decay rate should be low.

The City takes a totally different view of bacterial decay. According to Chapra's book *Surface Water-Quality Modeling* (Chapra, 1997), bacterial decay consists of three parts: natural mortality, sunlight-induced mortality, and settling. The sunlight term and settling term both effectively *increase* as depth *decreases*. This would imply that the overall loss rate will be higher in shallow waters like the tidal Hunting Creek system under low flow conditions. Chapra suggests 0.8/day as the natural mortality, with the overall rate increasing above that due to sunlight-induced mortality and settling. Consequently, a bacterial decay rate of 1.0/day, as used in the Potomac River on other studies, is reasonable, if not conservative. The 0.1/day value used in the TMDL is questionable in light of this reference and the higher bacteria decay rates used elsewhere in the Hunting Creek, Cameron Run and Holmes Run Watersheds and other nearby TMDLs.

D. CSOs Do Not Cause Water Quality Standards Exceedance

In the case of the CSO discharges into the Hunting Creek Watershed, the reasonable potential to cause an exceedance of the water quality standards was assessed during the last VPDES permit reissuance. The Permit Fact Sheet explains that most of the bacteria are from background sources and the CSOs do not cause an exceedance of water quality standards. The following text table provides a summary of monthly *E. coli* geometric mean concentrations (cfu/100 mL) used by the VA DEQ to develop the permit.

			Hunting Creek		
Scenario	**Hoofs Run at Cameron Run**	**Oronoco Bay**	**GW Pkwy Bridge**	**Near Royal St Outfall**	**Belle Haven marina**
Background Loads and CSO discharges	**385**	**269**	**190**	**140**	**340**
Background Loads only (no CSO)	**326**	**143**	**162**	**136**	**288**
CSO Loads and only 5% of Background	**61**	**50**	**31**	**33**	**39**

Based on earlier modeling of the system, the results show that the level of the receiving waters exceedance of the geometric mean standard for *E. coli* of 126 cfu/100 mL for both scenarios is not significantly changed with the complete removal of CSO. In addition, as the 5% background scenario shows, CSOs on their own do not result in exceedance of the monthly geometric mean standard if background is controlled. The results also show that, although the CSO discharges contribute to a decrease in water quality, they do not cause exceedance of the standard. The

water quality would still not meet the standard even if no CSOs were present due to background. Consequently, further control of CSOs beyond what is already in place and planned by the City will not be consequential in the attainment of water quality standards.

Data included in the Draft TMDL Report support the continued validity of this finding in the Permit Fact Sheet. A modified version of Table 3-22 was prepared with a final column added to quantify the E. coli concentration associated with the BST data. As shown, only one observation (240 cfu/100 mL on 8/15/2006) out of twelve exceeds (slightly exceeds) the single sample maximum of 235 cfu/100 mL. Put in context, this dataset using BST meets the requirement that no more than 10 percent of total samples in an assessment period can exceed the E. coli concentration of 235 cfu/100 mL. Furthermore, it supports the earlier finding based on the City's modeling that CSOs do not cause exceedance of the water quality standard. It should also be recognized that human sources in this case refer to septic tank sources, SSOs, and other sources such as marina discharges in addition to CSOs. That, coupled with the earlier explanation that the impact of CSO loadings are conservative (overstated) and that numerous marina sources are overlooked, means that the CSO loads do not cause or contribute to standards exceedances.

Additionally, the highest E. coli observations (on 8/15/2006, 9/12/2006 and 11/6/2006) occurred during dry periods with no rainfall on the monitoring days or on the preceding days. The human contribution on these dates was low, ranging from 8 to 12 percent. This data indicates that human based sources, including sources other than CSO, contribute a small percentage of the bacteria load when significant violations of the maximum criteria occur during dry weather conditions.

Modified Table 3-22: BST Data Collected During 2006 in the Holmes Run, Cameron Run, and Hunting Creek Watershed (Modified)

Station ID	Date of Sample	E. coli (cfu/100 mL)	Number of Isolates	Wildlife	Human	Livestock	Pet	E. coli (cfu/100 mL) Human
1AHUT000.01 4 out of 12 samples (33%) exceed 235 cfu/100mL	1/9/2006	96	24	29%	25%	8%	38%	24
	3/6/2006	96	24	12%	8%	17%	63%	8
	3/27/2006	36	8	62%	0%	0%	38%	36
	4/18/2006	337	23	26%	9%	52%	13%	30
	5/16/2006	154	24	46%	8%	25%	21%	12
	6/19/2006	82	24	8%	54%	17%	21%	44
	7/17/2006	98	23	26%	22%	17%	35%	25
	8/15/2006	2,000	24	68%	12%	12%	8%	240
	9/12/2006	1,670	21	33%	10%	43%	14%	167
	10/16/2006	144	23	92%	4%	0%	4%	6
	11/6/2006	1,790	24	54%	8%	0%	38%	143
	12/11/2006	100	23	87%	9%	4%	0%	9

In other TMDLs developed by EPA where the background load is a significant portion of the total load, EPA has chosen to focus efforts on reduction of background contributions rather than requiring expensive and technically infeasible reductions from point sources. This is particularly

important because typically this addresses sources in both dry and wet weather uses. Addressing dry weather sources is much more likely to return actual public use benefits than wet weather controls.

The TMDL for Hunting Creek should have included model parameters similar to the ones used in the TMDLs done by EPA and set the WLA for the CSOs at the current control level established in the NPDES permit. The TMDL should note that because the impairment of Hunting Creek by bacteria is due predominantly to background sources, the complete elimination or significant reduction of bacteria from CSO point source discharges would produce little benefit to the water quality of Hunting Creek and none during dry weather when the potential for instream public use is most probable. However, please note that Hunting Creek is composed of mudflats with little or no access that does not lend itself well to primary contact uses.

In addition, the elimination or significant reduction of bacteria from CSO point sources, as well as wildlife and MS4 loads, will be expensive and likely technically infeasible to implement. The CSOs are owned by the City of Alexandria and are funded through taxpayers. Significant CSO reduction has already occurred. Thus, before additional requirements inconsistent with the City's approved LTCP are required, reductions from other sources should be fully assessed. Therefore it is best to move cautiously before implementing wasteload allocations that may cause significant economic hardship in a situation where, as here, the expectation is that most of the needed bacteria reductions will be achieved through control of background sources.

There is also a need to look carefully at the underlying designated use and whether it is attainable given the level of reductions needed from background and potentially uncontrollable sources (e.g., seagulls, wading birds, and wildlife in general). This analysis of the designated use is a key part of the CSO Control Policy. Reductions in bacteria from CSOs will be achieved through continued implementation of the existing CSO control program as required by the VPDES permit, as well as staged sewer separation projects as described in the Combined Sewer Separation Area Reduction Plan (2005). Any disruption of this approach should only come after a use attainability analysis is conducted and then with the benefit of ten years of implementation of controls for other sources.

PART III: Compilation of Specific Comments on the Draft TMDL Report

Page	Location	Comment(s)
ES-1	Par. 5	Impaired segment area of 0.526 sq miles for Hunting Creek needs to be correlated at some point in the report to the Virginia portion of the area covered by the ELCIRC model.

Page	Location	Comment(s)
ES-3	Par. 4	The description of the Cameron Run HSPF model suggests that it covers the entire drainage to Hunting Creek. It is the City's understanding that it does not cover the combined sewer area that is covered with a separate hydrology and hydraulic model. If it does cover the entire drainage to Hunting Creek then some double counting of area may be occurring.
ES-3	Par. 1	"…no agriculture in the watershed", should be revised if there is no "land zoned for agricultural use."
ES-3	Par. 2	"…several general VPDES permits issued for industrial stormwater within the ~~Hunting Creek~~ TMDL study watersheds." Not all of the individual permits are within the Hunting Creek watershed.
ES-5	Par. 5	The ELCIRC application for Hunting Creek is two-dimensional, so that should be clearly noted in this paragraph.
ES-5	Par. 1	Shouldn't the text refer to three and four-sided polygons for the ELCIRC model grid?
ES-5	Par. 2	Use of synthetic tide data for both forcing conditions and "observations" does not provide "verification" of the model comparable to calibration. It may provide additional support that the model is providing reasonable predictions of water surface elevations. Is there a reason why an independent confirmation of the hydrodynamic model could not be performed other than perhaps the lack of additional Chesapeake Bay model results to drive the tidal boundary conditions?
ES-5	Par. 3	The term "matched" should be qualified with respect to the characterization of the ELCIRC calibration predictions versus observed data, since this infers a degree of preciseness that is probably not intended. As pointed out elsewhere in the City's comments, the comparison of median values is consistently and significantly off - with the median of simulated values materially lower than the median of the observed data.
ES-6	Equation	The bacteria translator equation needs to be properly formatted.
ES-7	Par. 3	It is noted that the modeling approach for the TMDL condition does not take advantage of available dilution in the Potomac River. A review of recent Potomac data suggests that there is currently a lot of available dilution in the Potomac – long periods wherein the bacteria concentrations are well below the water quality criteria. It should be expected that the current condition will experience further improvements with implementation of the Potomac Bacteria TMDL.
1-7	Par. 3	The statement about loading rates for watershed-based modeling only being available in terms of fecal coliform begs the question as to when DEQ will be able to shift to modeling E. coli directly for developing TMDLs. What is the anticipated length of this "transition" period and what is DEQ actively doing to shift away from an approach that increases uncertainty in the TMDL?

Page	Location	Comment(s)
2-1	Par. 2	The discussion of critical conditions as the "worst case scenario" is at odds with CSO control planning called for under the Clean Water Act's CSO Control Policy. CSO controls are typically evaluated under "average annual" conditions. Reconciling this conflict is another reason that a use attainability analysis should be performed before any controls inconsistent with the City's approved CSO LTCP would be required
2-2	Par. 1	"No land is used for agriculture." And on Page 3-3, Paragraph 2 "There are no agricultural activities". This should be revised if there is no "land zoned for agricultural use."
2-6	Fig. 2-4	For consistency with other locations, the translated FC to E. coli concentrations should be shown in bottom graph for 2003-2008 for Station 1AHUT000.01. Is there a technical reason for why the translated concentrations are not shown?
3-4	General	With regard to actual uses, Cameron Run, Hooff's Run and the tidal Hunting Creek system are not easily accessible for primary contact recreation. There are no beaches or public access points. These channels are highly modified, "flashy", and used as flood control. They therefore are not hydraulically suitable for swimming. Hunting Creek consists mostly of mudflats that are conducive to primary contact recreational use. In addition, safety issues make these waters unsuitable for primary contact recreation. For these reasons, the locality does not recommend that citizens swim in these waterways. A statement to this effect should be included to round out the watershed description.
3-4	Last Par.	The City's CSS area is approximately 540 acres, not 560.
3-4	Last Par.	This should include a discussion of how many CSS communities there are in the U.S.
3-6	Par. 3	Table 3-3 shows that it was assumed that all (100%) of the actual soils were designated as hydrologic soil group "B", so the word "predominately" would appear to understate this. Yet there is no actual soil hydrologic group for those areas of the watershed that are water and Alexandria may be categorized as "urban land" complex that contains a large fraction of marine clays with very low permeability.
3-20	Table 3-17	Median fecal coliform concentrations should be reported rather than averages. Also, presenting the criterion exceedances for these data seems irrelevant given that the TMDL is for E. coli.
3-21	Table 3-18	Median fecal coliform concentrations should be reported rather than averages.
3-25	Table 3-22	The text should note that the table reveals that wildlife is clearly the dominant source of bacteria in the watershed.
3-28	Figure 3-4	It appears that "Figure 3-4" should be titled as "Figure 3-5". .
3-30	Par. 2	This paragraph should also acknowledge the City of Alexandria's non-regulatory Combined Sewer Service Area Reduction Plan (2005) which has the goal of separating the combined sewer system.

Page	Location	Comment(s)
3-32	Par. 1	"no septic systems" should be changed to "no known septic systems"
3-32	Last Par.	How are there "221 septic systems in the entire Hunting Creek drainage, 97 of which are in Holmes Run watershed and 221 in the Cameron Run watershed? Either a comma is missing or the numbers don't add up.
3-34	Par. 1 and Table 3-29	The 85% reduction for goose densities from original estimates needs further explanation in the text. This appears to relate to population control measures noted later in the report, but that text refers back to this section (3.5.3) for more detail. It appears that wildlife densities used in the TMDL came from other TMDL Reports. These are not primary sources of information. Wildlife densities should be based on actual data from the watershed.
3-35	Table 3-31	Documentation of the values for "Portion of the Day in the Stream" should be more fully developed in the text, since this TMDL appears to rely heavily on other TMDL reports and these may not be the original sources for this information. Secondary sources, such as other TMDL reports, should not be cited directly for the selection of model parameters. When they are, the original sources should also be cited. DEQ should also explicitly clarify that the footnotes in Table 3-31 refer to the percentages that are presented for each species.
3-35	Table 3-31	Squirrels and Birds (Seagulls, red-breasted Robins, Starlings, etc) should be included in the Wildlife category for Land Sources and/or Direct Deposition. EPA's Fecal Coliform Bacteria TMDL for the Lower Saluda River and Tributary Stations (Miller, September 2004) used deer as a surrogate for other wildlife, and therefore represented other wildlife by additional deer in the model since "other animals contribute to wildlife loads such as possum, squirrel, muskrats and birds" (Page 7).
3-35	Pets	Use of national average estimates may under-represent the number of dogs in Alexandria; given our large pet population. Since pet information is critical, it would seem that more accurate local numbers should have been used.
4-1	Par. 3	The text should clarify that calibration is typically done by adjusting model parameters within generally accepted and scientifically supportable ranges.
4-2	Equation	The translator equation needs to be properly formatted.
4-4	Par. 1	Baseflow (AOQC) and interflow (IOQC) bacteria concentrations are mentioned, but the significance of these to the HSPF model applied here is not discussed. These model calibration parameters are listed in Table 4-4 as ranging over up to four orders of magnitude, so they would appear to be significant to the model calibration. The text needs to document how these parameters were determined and input to the model.
4-6	Par. 3	Why was the Reagan National Airport precipitation data used instead of the processed rainfall data from the Chesapeake Bay Phase 5 watershed model, given that the other Phase 5 model meteorological data were used?
4-11	Figure 4-4	The X and Y scales on the plot should be the same, and a 1:1 line should be shown. Using daily comparisons to judge the HSPF flow calibration is probably overly stringent, but they should be presented properly if used.

Page	Location	Comment(s)
4-15	Figure 4-7	The X and Y scales on the plot should be the same, and a 1:1 line should be shown. Using daily comparisons to judge the HSPF flow calibration is probably overly stringent, but they should be presented properly if used.
4-18	Table 4-4	Table 4-4 should be split into two tables for the HSPF model parameters: one for hydrology and one for the bacteria calibration. It is noted that a broader and higher range for the rate of accumulation of bacteria (ACQOP) was used in the nearby Bacteria TMDL for the Four Mile Run Watershed. Other discrepancies in the bacteria concentration in interflow (IOQC parameter) and active groundwater (AOQC parameter) between these neighboring watersheds with similar development characteristics were also noted. The importance of these parameters to calibration and to TMDL scenarios is not addressed, leaving the reviewer with much uncertainty.
4-20	Entire	The approach used to set HSPF calibration targets results in an unspecified degree of added uncertainty for a critical factor related to how the model is calibrated. This uncertainty should be acknowledged, investigated and propagated with respect to how the model predictions are evaluated against the "targets" and with respect to how the model is utilized for TMDL scenarios.
4-21	Par. 2	See previous note (page 4-4) about the AOQC and IOQC parameters. The text indicates these are being used for pervious surface areas, but how they were determined, or their significance to the HSPF calibration, is not discussed.
4-21	Par. 3	"Section 4.1.7" should be referenced, not "Section 4.1.6"
4-22	Table 4-6	A more detailed discussion on how the four primary subwatersheds were calibrated should be provided in the report text, since the calibrated HSPF parameters vary significantly and a basis for how these were adjusted between the subwatersheds should be provided.
4-28	Figures 4-16 and 4-17	The HSPF median of the HSPF simulated fecal coliform concentrations significantly under predict the median of the observed data for both Cameron Run and Hooff's Run. These graphs are indicative of under predicting bacteria loading to Hunting Creek. Also, the ELCIRC model calibration approach used these same types of comparisons, so it should not be considered unreasonable to judge the HSPF calibration results by this means in addition to the calculated calibration targets which have their own unrecognized uncertainty.
4-29	Par. 1	The text describing why goose population densities were returned to original (circa 1996-2000) levels refers the reader back to Section 3.5.3 for a description of this. However, Section 3.5.3 merely provides a personal communication reference and states what was done (85% reduction) for the calibration period. The order in which this information is presented in the report is confusing. As previously noted (comments on page 3-34), more detail and documentation on this key input should be provided in Section 3.5.3.

Page	Location	Comment(s)
4-35	Par. 3	The text regarding how Blue Plains WWTP daily flows and concentrations were "taken directly from the average monthly flows and concentrations" is ambiguous and should be clarified. Note that the official name is the DC (not Washington) Water and Sewer Authority, and is now referred to as DC Water.
4-37	Table 4-14	It would be useful if the time periods associated with Blue Plains Bypass events was presented in the summary statistics.
4-39	Par. 1	Details regarding the ELCIRC simulations for which WXTide32 was used to establish tidal boundary conditions should be provided, since these were not used for the ELCIRC hydrodynamic calibration.
4-42	Par. 42	The City would like to see the actual model application of ELCIRC with this model grid tested with respect to the model behavior, since the model executable and code are unavailable. Has any testing of this nature been performed? The City has no means by which to review the model performance with respect to this site-specific application, since it is considered to be the proprietary intellectual property of VIMS.
4-43	Par. 1	The reference to Loftis and Wang (2010) and the discussion of the related tests is inappropriate (at least at this time), since the paper is in preparation and has not been submitted for publication based on the information noted in the list of references to the TMDL.
4-45	Par. 1	The City concurs with the apparent characterization of 2003 as being the most appropriate year for judging the calibration of the ELCIRC model for bacteria, since the data for 2003 span more months and represent varying hydrologic conditions better than any of the other yearly monitoring periods.
4-46	Par. 2	The text in Section 4.3.4 should clearly state the Hunting Creek and Potomac River ELCIRC model grid is two-dimensional.
4-6	Par. 2	Text states there are "14,120 grid cells and 4,550 nodes". TAC #3 presentation (Slide 19) states that ELCIRC has 4,450 cells. Please clarify.
4-50 and 4-51	Par. 1 and Fig. 4-23	The time series comparisons for the calibration of the hydrodynamic model to observed water levels appear reasonable. However, a statistical summary of the calibration comparison results should also be provided. Ideally, comparisons to velocity measurements would also be provided, but these do not appear to be available, and the fact that the available hydrographic survey data are limited should be noted in the report.

Page	Location	Comment(s)
4-52	Par. 1	In regard to ELCIRC, it would probably be more appropriate to validate that WXTide32 can reasonably estimate the observed water levels for USGS Station 0165258890 and for Chesapeake bay-wide model predictions used to construct the ELCIRC model calibration boundary conditions, rather than using it to produce synthetic data to "validate" the hydrodynamic model. While a simulation of synthetic data (for boundary conditions and "observations") may help demonstrate that the model is functioning properly, this should not be considered a true validation as it really a comparison between two "models". The only thing that really needs to be validated is how well WXTide32 compares to real data, since WXTide32 is used to drive the Potomac tidal boundary conditions (upstream and downstream) for the longer-term simulations. Application of ELCIRC to simulate a month-long period for observed hydrologic conditions different from the calibration period would be preferred for either validation purposes or simply to enhance the model calibration (if need be) by using a longer period of observed data. Is there a reason for why this is not feasible?
4-60	Par. 2	"Dispersion" during hydrodynamic transport is noted as one of the factors determining bacteria concentrations in the receiving water, and we concur. However, the text describing ELCIRC in the report does not clearly describe how this transport mechanism is handled in the model.
4-58	Par. 1	The discussion regarding qualitative consistency with tidal records obtained by Cerco and Kuo (1983) should be expanded to describe those records with at least a minimal degree of detail and/or provide a graphical representation that shows there is "qualitative consistency". The TMDL report should serve as a stand-alone document with respect to this type of information regarding the modeling results.
4-60	Par. 2	While preliminary results may have indicated no improvement in "model performance" with temperature correction of the bacteria decay rate, temperature correcting these rates is a generally accepted practice and was applied for the decay rates used in the Cameron Run HSPF model. The Draft TMDL Report only states that model performance was not improved, not that it was hindered. If the performance was hindered, then the reason for this should be investigated to determine whether this would be a potential modeling and/or data issue.

Page	Location	Comment(s)
4-62 through 4-77	all	A range of potential first-order bacteria decay (die-off) rates, from 0.1 to 0.9 per day, was investigated through model calibration. The selected calibration rate is the lowest rate from the range that was tested, but model-data comparisons for this rate (Figure 4-35) appear to depict that the model under-predicts median bacteria concentration even at this low rate. If the model calibration approach was to simply adjust the decay rate to best match that data distribution, then why wasn't a lower rate (or even zero decay) investigated as part of the model calibration effort? Neglecting that, the selected calibration decay rate has been acknowledged by DEQ's consultant as being at the extreme low end of the likely possible range during meetings where the modeling has been discussed. The model "fit" to data for the years simulated is described as "good". It is "good" in comparison to model predictions generated using higher decay rates, but not necessarily based on any objective measure (e.g., a lower rate would likely produce better results). In fact, there is no objective quantitative assessment of the model calibration provided in the report, so "good" is simply a qualitative judgment of the calibration. We also note the following: 1. The TMDL report provides no specific supporting information for the range that was tested for calibration of the ELCIRC model. 2. The calibrated instream bacteria decay rates for the non-tidal HSPF modeling ranged from 2 to 10 per day, and incorporated a temperature correction factor. 3. The bacteria decay rate instantly changes by greater than an order of magnitude from just above the City of Alexandria CSO outfalls to 0.1 per day where Hooff's Run is simulated as a tidal reach by the ELCIRC model. Even though these are two distinct models the decay rates are both first-order decay rates and effectively represent the same loss mechanism. The difference in the magnitudes for the calibrated rates between the two models requires some degree of explanation, but the TMDL report provides none. 4. In short, based on the modeling results presented in the report for both ELCIRC and HSPF, a calibrated bacteria decay rate in ELCIRC of 0.1 per day (or even lower) indicates that there is unaccounted for bacteria loading to the system and/or that perhaps the HSPF model has not been calibrated to appropriate data-based targets (and thus may account for at least a portion of the apparent missing bacteria load).

Page	Location	Comment(s)
4-88 through 4-90	all	The section entitled "Additional Remarks on ELCIRC Bacteria Calibration" provides a depiction of what the bacteria decay rate is sensitive too with respect to transport processes. However, the last sentence on page 4-90 makes an assertion regarding when the calibrated decay rate "should be expected to be towards the low end of values reported in the literature" that does not appear to be supported by the analysis presented prior to that statement. We fail to see how this analysis actually supports the assertion being made at the end. Further clarification about this statement should be provided, or it should be removed from the report.
5-6	Par. 1	The methodology used to reduce CSO loading for the TMDL scenarios is likely inconsistent with how reduction in CSO would be achieved under a CSO LTPC where additional controls are employed to reduce the frequency and magnitude of CSO events. A more refined methodology, utilizing the City's model of the CSS, should be employed during TMDL implementation in order to better represent any reductions that may actually be necessary to meet water quality standards in a manner consistent with the EPA CSO Policy.
5-7	Par. 5	The text should clarify that the approach of using a 0.0/day decay rate in the Potomac River provides only an "approximate" representation of fixing the boundary at the water quality standard. Various other approaches could be used to implement this in an exact manner. The chosen approach reduces the computational (and labor) effort, but it is not necessarily correct or the best approach for this.
5-9	Bullets 1 through 4	Is the spatial averaging methodology sensitive to the order of steps 2 and 3? It is not entirely clear whether step 2 should be performed before step 3, so it would be useful to know how sensitive the outcome is to the order in which these are done.
5-11	Table 5-2	The exceedance should be expressed in terms of the number of months violating out of the 24 month simulation period, since this information is more useful. The exceedance percentages infer more accuracy than is likely intended, and there is more value to knowing that a given scenario has 1 month in exceedance out of 24 than to say the exceedance rate is 4.2%
5-12	Par. 1 and Table 5-T	Scenario 5-T appears to be mistakenly referenced instead of the Scenario 10-T, which is the selected TMDL scenario. This appears to simply be a typographical error. If so, then the TMDL allocations remain unaffected and the draft TMDL should not need to be re-noticed for public comment.
5-14	Par. 3	Again on this page, Scenario 5-T appears to be mistakenly referenced instead of the Scenario 10-T.
6-4	Par 2	The City believes that previous DEQ permit approvals established that the CSOs do not cause or contribute to WQS violations. Further, the use is not attainable. The City is committed to continue its CSO Area Reduction Plan; however, it is clear that a Use Attainability Analysis by the State would be required prior to controls beyond that plan.

Page	Location	Comment(s)
4-17	Table 4-4	The units for SQOLIM should be cfu/acre (or #/acre) instead of #.
A-3	Table A-3	The units for accumulation rate (ACQOP) should be cfu/acre-day.
A-3	Table A-4	The units for accumulation rate (ACQOP) should be cfu/acre-day.

REFERENCES

Chapra, Steven C., 1997. *Surface Water-Quality Modeling*, McGraw-Hill Series in Water Resources and Environmental Engineering, McGraw-Hill, New York City, NY.

EPA, 1979. *User's Manual for the Dynamic (Potomac) Estuary Model,* Annapolis, MD.

DC DOH, 2004. *District of Columbia Final TMDL for Fecal Coliform Bacteria in the Upper Potomac river, Middle Potomac River, Lower Potomac River, Battery Kimble Creek, Foundry Branch, and Dalecarlia Tributary*, Washington, DC.

Hartman, 2010. http://www.chicagoparkdistrict.com/docs/8e4762a1-a0fe-401c-8d6e-a68214d2dbb7_document.pdf

VA DEQ, 2010. Bacteria TMDL for the Tidal Four Mile Run Watershed, Report prepared by the Interstate Commission on the Potomac River Basin, Rockville, MD.

It is our understanding that we can expect a written response from DEQ. If you need any clarification to the data request and/or questions above, please contact us via phone or email. Thank you again for the opportunity to participate in this process.

Best regards,

William J. Skrabak

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Paul Calamita, Aqua Law
Clyde Wilber, P.E., Greeley and Hansen
Mike Sullivan, Limno-Tech, Inc.

Attachment D

Wasteload Allocation Tables from the Hunting Creek TMDL

Bacteria TMDLs for the Hunting Creek, Cameron Run, and Holmes Run Watersheds

Table 5-4: E. coli Wasteload Allocation for ASA Advanced Wastewater Treatment Plant

Permit Number	Permit Type	Design Flow (MGD)	Permit Concentration (cfu/100 ml)	Wasteload Allocation (cfu/day)	Wasteload Allocation (cfu/year)
VA0025160	Municipal	54	126	2.58E+11	9.40E+13
Allocation for the Future Growth of Point Sources:				5.75E+10	2.10E+13
Total:				3.15E+11	1.15E+14

Table 5-5: Wasteload Allocation for COA Combined Sewer System[1]

Permit Number	Outfall	Wasteload Allocation (cfu/day)	Wasteload Allocation (cfu/year)	Percent Reduction (%)[2]
VA0087068	002	1.72E+11	6.26E+13	80%
	003	2.10E+09	7.68E+11	99%
	004	2.33E+09	8.52E+11	99%
	Total	1.76E+11	6.42E+13	86%

Table 5-6: *E. Coli* Wasteload Allocation for MS4 Permits for Holmes Run[1]

Permit Number	MS4 Permit Holder	Wasteload Allocation (cfu/day)	Wasteload Allocation (cfu/year)	Percent Reduction (%)[2]
VAR040057	City of Alexandria	6.58E+10	2.40E+13	83%
VAR040062	VDOT			
VA0088587	Fairfax County	1.50E+11	5.47E+13	83%
VAR040104	Fairfax County Public Schools			
VAR040062	VDOT			
VAR040065	City of Falls Church	1.40E+10	5.12E+12	83%
VAR040062	VDOT			

Table 5-7: *E. Coli* Wasteload Allocation for MS4 Permits for Cameron Run[1]				
Permit Number	**MS4 Permit Holder**	**Wasteload Allocation (cfu/day)**	**Wasteload Allocation (cfu/year)**	**Percent Reduction (%)[2]**
VAR040057	City of Alexandria	8.77E+10	3.20E+13	83%
VAR040062	VDOT			
VA0088587	Fairfax County	2.63E+11	9.60E+13	83%
VAR040104	Fairfax County Public Schools			
VAR040062	VDOT			
VAR040065	City of Falls Church	1.40E+10	5.12E+12	83%
VAR040062	VDOT			

Table 5-8: *E. Coli* Wasteload Allocation for MS4 Permits for Hunting Creek[1]				
Permit Number	**MS4 Permit Holder**	**Wasteload Allocation (cfu/day)**	**Wasteload Allocation (cfu/year)**	**Percent Reduction (%)[2]**
VA0088579	Arlington County	1.01E+09	3.68E+11	98%
VAR040062	VDOT			
VAR040057	City of Alexandria	1.02E+11	3.73E+13	92%
VAR040062	VDOT			
VAR040111	George Washington Memorial Parkway			
VA0088587	Fairfax County	2.79E+11	1.02E+14	83%
VAR040104	Fairfax County Public Schools			
VAR040062	VDOT			
VAR040111	George Washington Memorial Parkway			
VAR040065	City of Falls Church	1.40E+10	5.12E+12	83%
VAR040062	VDOT			

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